

## 4. ENVIRONMENTAL CONSEQUENCES

### 4.1 Analysis Assumptions and Guidelines

1. The Reserve Management Committee would be formed to develop monitoring schemes, analyze data and adjust management in keeping with this management plan, technological advances and research findings.
2. Participating agencies and tribes would be staffed with adequate expertise and resources to participate in a timely and effective manner as cooperators on the Reserve Management Committee.
3. The allocation of funds for implementation of the future management of the Reserve would be adequate to allow the outcomes projected here.
4. Paved roads average 30 feet in width and unpaved roads average 9 feet in width for acreage calculations.
5. Preservation of native plant communities supports the wildlife species dependent upon them.

### 4.2 Critical Elements

The interdisciplinary team considered all of the following elements of the human environment when analyzing the impacts of the actions proposed under each alternative. The elements checked as “Not Present” or “Present, Not Affected” were either not present on the Reserve or not affected by any of the alternative management actions considered.

**Table 8. Critical elements of the human environment.**

Element	Not Present	Present not Affected	Present and Affected
Air quality			X
Special Status Species			X
Areas of Critical Environmental Concern	X		
Hazardous Substances or Solid Wastes		X	
Cultural Resources		X	
Water Quality Concerns		X	
Wild Horse Herd Management Areas	X		
Prime or Unique Farmlands	X		
Wetlands/Riparian Zones			X
Floodplains			X
Wild & Scenic Rivers	X		
Native American Religious Concerns		X	
Wilderness Study Areas	X		
Environmental Justice (E.O. 12898)		X	
Noxious Weeds, Invasive Species			X

## **4.3 Effects of Alternatives on Native Plant Communities**

### **4.3.1 Management Considerations**

Nine species of noxious weeds and several other non-noxious invaders are known on the Reserve. While none of these currently infest large acreages, they all have potential to spread rapidly and displace native vegetation. Spotted knapweed and Rush skeletonweed, in particular, are threats to spread rapidly.

Of the non-noxious weeds, invasion by cheatgrass, with its accompanying potential for increased fire frequency, is a particular threat to the sagebrush communities. This annual grass has become common in isolated patches in areas subjected to repeated disturbance, such as along the de-watered channel of Birch Creek, other livestock concentration areas and along roads. Minimizing cheatgrass spread is critical to avoid the potential for increased fire risk that has plagued many other areas within the Snake River Plain.

The major vectors for weed spread on the Reserve are roads, and their use, livestock grazing, and wildfire and wildfire suppression. In general, minimizing weed invasion requires reducing soil disturbance, maintaining competition from desirable plants and minimizing seed spread vectors. To minimize soil disturbance on the Reserve, roads, road use and off-road travel must be minimized and livestock, wildfire and wildfire suppression properly managed.

Management to conserve biotic and genetic diversity of native plant communities found on the Reserve requires careful selection of plant materials used in restoration projects. Traditional definitions of “native species” consider plants only to the species level. For example “Secar” bluebunch wheatgrass was originally collected from the Palouse Prairie and is genetically different from the bluebunch wheatgrass plants native to the Reserve. Most commercially available cultivars originate from one or more sources and contain the genetic materials specific to those. Use of these cultivars for restoration projects introduces foreign genetics that could ‘swamp’ the local population via gene flow or displace the local plants through competition (Jones, 1997). Most commercially available cultivars of native species do not originate from the upper Snake River Plain.

Crested wheatgrass species were seeded in revegetation mixtures on the INEEL from the 1940s until the late 1990s. These are species native to Eurasia and were selected for ease of establishment, rapid production of ground cover, competitiveness with weeds and low seed cost. However, most of these characteristics also make them highly competitive with the native plants. Established crested wheatgrass stands along Lincoln Boulevard, the State Highways and surrounding INEEL facilities are spreading into adjacent native plant communities.

Four species of special status plants are known to exist on the Reserve and an additional six species are known on similar habitat within a few miles. None of these are listed as threatened or endangered under the ESA. The BLM is bound by Federal statutes, regulation, and agency policy to conserve special status plant species and biological diversity on public lands. In general, management for retaining plant communities in high quality condition will also provide for the rare species, but some rare species are so localized that populations can be eradicated by a single action such as gravel pit development, road construction, or a fire containment line.

Wildfire and fire suppression both can have wide spread effects on plant communities. While fire has the detrimental affect of killing sagebrush, soil disturbing fire suppression can also have many negative impacts. Recent research on the INEEL (Blew et al., 2002) found that the frequency of cheatgrass on fire containment lines was significantly higher than on adjacent undisturbed burned areas, when the burned areas were in good ecological condition prior to the fire. Therefore, minimizing surface

disturbing fire suppression tactics may be as important as minimizing fire size. Selection of fire suppression tactics is often a trade-off between minimizing fire size and minimizing soil disturbance. Minimum Impact Suppression Tactic (MIST) emphasizes suppression of wildfire using methods that minimize negative effects on surface resources. Tactics are selected which take advantage of natural fuel breaks, minimize new soil disturbance, and minimize damage to high value resources. Specific fire conditions, including potential for spread, current and potential fire-weather, and potential for damage to resources are considered. Application of these tactics may result in larger fires, but less soil disturbance and cheatgrass spread.

Assignment of Resource Advisors to fire suppression teams increases the knowledge base of ecological and cultural resources of the team. **This is standard procedure on most wildfires on BLM and USFS managed lands.** With fire personnel focusing on fire suppression, sensitive ecological and cultural resources can easily be overlooked and destroyed. People trained in these resources, when assigned as Resource Advisors, work directly with Incident Commanders to advise them about minimizing damage to resources. While there are situations where maximum suppression effort and negative impacts to resources are necessary to protect life and property, minor adjustments in fire suppression actions can often significantly reduce destruction to valuable resources while still stopping the fire.

Vegetation recovery following wildfire depends largely on the condition of the plant community before the fire. Research has shown that areas with in good ecological condition, return to native grasses and forbs within two to three years following fire (Patrick and Anderson, 1999; Ratzlaff and Anderson, 1995). Efforts to revegetate by seeding can actually slow the recovery process of such areas. Ratzlaff and Anderson (1995) and Blew and Jones (1998) and Blew (1999 and 2000) reported that the soil disturbance caused by drilling seed into a recently burned areas slowed recovery of native species and may have led to increased weed infestation.

Natural reestablishment of sagebrush is very slow following fire, especially on dry Wyoming big sagebrush sites. Research has shown that 85–90% of sagebrush seed falls within 1 meter of the producing plant, with a maximum dispersal distance being 30 meters (Wagstaff and Welch, 1990; Young and Evans, 1989). In addition, recent reports suggest that Wyoming big sagebrush requires wet years for significant seed production and seedling establishment (Maier et al., 2001). With these factors, a fire return interval of more than 50 years is required for sagebrush to regain dominance on burned areas. Because of these constraints, retention of isolated unburned patches of sagebrush within burned areas is critical.

Returning all or a portion of the diverted Birch Creek water to the Reserve could allow development of riparian zone along the creek channel. While creating riparian habitat would benefit many wildlife species on the Reserve, the flows in the ditch are transporting spotted knapweed seeds originating from Birch Creek above the diversion point.

#### **4.3.2 Effects of Alternative 1 (The Proposed Action)**

**Lands and Minerals:** Eliminating new mineral material development sites would remove all potential for destruction of native plant communities and weed invasion due to these causes **on the Reserve. Societal demands for these developments would likely result in their effects being displaced to other areas.**

**Roads:** Limiting access to only authorized research vehicles on 154 miles (59%) of unpaved roads would reduce soil disturbance due to road use and maintenance. Weed spread would be reduced by proportional amounts. This alternative would limit use of more miles of road than Alternatives 2 or 4, but less than Alternative 3.

**Noxious and Invasive Plants:** Establishment of an IWM program would increase effectiveness of weed control and reduce total acres of noxious and invasive plants relative to Alternative 2. Vehicle washing under this and Alternative 3 would reduce, but not totally eliminate, importation of weed seeds to the Reserve from vehicles. Evaluation and restoration of some crested wheatgrass stands under this and Alternative 3 would reduce threats of this exotic species to expanding into adjacent native plant communities. Returning winter flows to the lower Birch Creek channel would introduce spotted knapweed seeds to any newly created riparian area, requiring additional weed control.

**Revegetation:** The costs of revegetation seed mixtures would increase and the pace of recovery would be slower on seeded sites. Requiring use of only local plants for revegetation would minimize introduction of non-endemic genetics and possibility of unnatural long-term changes to the native plant communities, including any newly created riparian zones. In rare cases, non-indigenous species may be used, but this would affect only small acreages.

**Livestock:** Extension of the boundary fence between Wigwam Butte and Mahogany Butte allotments by 12.4 miles would reduce the potential for weed spread by livestock in lower Birch Creek. The integrity of the non-grazed area would also be improved. However, keeping the cattle on the Wigwam Butte Allotment may increase utilization levels on the allotment by increasing livestock concentration there. Requiring certified weed-free hay would eliminate importation of weeds contained in imported feed. Restoration of some livestock concentration areas would reduce the threat of weed invasion by an amount proportional to the acres restored.

**Wildlife habitat:** Actions proposed for wildlife habitat under this alternative would have no effect on plant communities.

**Surface water:** Returning winter flows to lower Birch Creek would increase storage of plant available water and riparian re-development relative to Alternative 2. Additional weed invasion along the channel would increase the need for weed control in the short-term. Over time, the seeds contained in the water would be reduced due to cooperative weed control efforts along Birch Creek at the source of the seed on BLM lands.

**Wildfire:** Formation of the Reserve Management Committee and use of Resource Advisors would improve monitoring and mitigation of fire and fire suppression impacts under Alternatives 1 and 3. This would also ensure a higher level of awareness of Reserve resources than under Alternatives 2. Application of prioritized MIST under this alternative would result in lighter application of fire suppression tactics than Alternatives 2 and 4, and could result in more total acres burned and sagebrush destroyed in the near-term. In the long-term, the potential for large wildfires may be reduced due to less soil disturbance and cheatgrass spread relative to Alternatives 2 and 4. Leaving unburned islands of vegetation within fire containment lines would enhance natural revegetation of burned areas, but may result in some fires escaping beyond containment lines.

#### **4.3.3 Effects of Alternative 2 (No Action)**

**Lands and Minerals:** Current management allows for new ROWs and mineral material sites. Processing applications for these developments would now consider Reserve resources, but weeds would likely invade and native plants be destroyed during and after construction.

**Roads:** Approximately 259 miles of roads and trails on the Reserve are available for use by all DOE-ID authorized users. Along with Alternative 4, this alternative would have the highest levels of annual disturbance due to road maintenance and use, and the most weed spread due to roads.

**Noxious and Invasive Plants:** The INEEL conducts weed spraying of known noxious weed infestations as budgets allow. No vehicles are washed prior to entering the INEEL. The spotted knapweed seeds contained in the Birch Creek winter return water flow enter the Reserve only a short distance before being directed to the T-28 North gravel pit.

**Revegetation:** Revegetation of disturbances on the Reserve would continue to allow the use of commercially available seed cultivars. This would minimize the cost and increase the speed of revegetation projects relative to Alternatives 1 and 3. Planting commercial cultivars of native species would introduce non-endemic genetics to the native plant communities that could lead to unnatural long-term changes to the plant community.

**Livestock:** Native vegetation has been degraded at livestock concentration areas and while these do not account for significant acreages, they do provide locations for weed establishment. Cattle movement from Wigwam Butte Allotment into the other allotments and the non-grazed area would continue due to insufficient fencing. This would continue the spread of weeds and cheatgrass due to cattle grazing. There are no limitations on imported feed quality and it is unknown if weeds have been imported with stock feed.

**Wildlife habitat:** Actions proposed for wildlife habitat under this alternative would have no effect on plant communities.

**Surface water:** Winter return water flows from the Birch Creek Hydropower diversion pass through the edge of the Reserve, and back to the T-28 North gravel pit. This imports spotted knapweed seeds a smaller distance into the Reserve than under the other Alternatives. There is currently no riparian vegetation on the Reserve.

**Wildfire:** Formation of the INEEL Wildland Fire Management Committee would provide monitoring and mitigation of fire and fire suppression impacts. However, without addition of the Sagebrush Management Committee and the use of Resource Advisors, this alternative would allow for heavier application of suppression tactics than Alternatives 1 and 3. In the short-term, this would likely result in fewer total acres burned and sagebrush destroyed. However, in the long-term, the increased soil disturbance would likely increase the spread of cheatgrass, causing larger and more frequent fires in the future.

#### **4.3.4 Effects of Alternative 3 (Enhanced Natural Resource Protection)**

Management actions proposed for **Lands and Minerals, Noxious and Invasive Plants, Revegetation, Surface water and Wildfire** under this alternative would have the same effects as under Alternative 1.

**Roads:** Limiting access to only authorized research vehicles on 165 miles (64%) of unpaved roads would reduce soil disturbance due to road use and maintenance. Weed spread would be reduced by proportional amounts. This alternative would limit use of more miles of road than the other alternatives.

**Livestock:** Extension of the boundary fence between Wigwam Butte and Mahogany Butte allotments would reduce weed spread and potential riparian impacts by livestock in lower Birch Creek. Requiring certified weed-free hay would eliminate the possibility importing weeds contained in stock feed. Restoration of some livestock concentration areas would reduce the threat of weed invasion by an amount proportional to the acres restored. In the long-term, retiring grazing permits would remove all impacts due to livestock grazing on the native ecosystem of the Reserve.

#### **4.3.5 Effects of Alternative 4 (Enhanced Opportunity for Resource Extraction)**

Management actions proposed for **Lands and Minerals, Roads, Revegetation**, would have the same effects as under Alternative 2.

**Noxious and Invasive Plants:** Establishment of an IWM program would increase effectiveness of weed control and reduce total acres of noxious and invasive plants the same as Alternatives 1 and 3. Not requiring washing of vehicles would result in more new weed invasion than under Alternatives 1 and 3. With no evaluation and restoration of crested wheatgrass stands under this alternative, this non-native species would continue to expand into native plant communities on the Reserve.

**Livestock:** Increasing stocking rates on the Sinks, Wigwam Butte and Twin Buttes Allotments by a total of 183 AUMs would increase grazing on approximately 24% of the Reserve. This would increase the size of the livestock concentration areas and the introduction and spread of weeds relative to the other alternatives. Implementation of herding of cattle on the Sinks and Wigwam Butte Allotments, or 19% of the Reserve and fencing the remainder of the Wigwam Butte Allotment boundary would partially mitigate these impacts. Requiring certified weed-free hay would be particularly important under this alternative due to increased presence of herders on the cattle allotments. Increased livestock grazing may reduce the potential for fire spread in the short-term.

**Wildlife habitat:** Actions proposed for wildlife habitat under this alternative would have no effect on plant communities.

**Surface water:** The effects of surface water management under this alternative would be the same as under Alternative 1.

**Wildfire:** Formation of the Reserve Management Committee and use of Resource Advisors would improve monitoring and mitigation of wildfire and fire suppression. This would also create a higher level of awareness of Reserve resources than under Alternative 2. However, heavier application of suppression tactics would impact those resources more than under Alternatives 1 and 3. In the short-term, this alternative would likely result in fewer acres of sagebrush burned than under Alternatives 1 and 3, due to heavier application of fire suppression tactics. In the long-term, with increased disturbance due to fire suppression and the resulting increased cheatgrass spread, this alternative could lead to larger and more frequent fires.

#### **4.3.6 Summary of Effects on Native Plant Communities**

**Alternative 1:** Management actions under this alternative to eliminate new ROWs and gravel pits, reduce road use, increase weed control efforts, restore livestock concentration areas, control livestock distribution, reestablish riparian vegetation, and minimize soil disturbance by wildfire suppression would, in combination, provide a large amount of protection of native ecosystems, but not as much as Alternative 3.

**Alternative 2:** Existing INEEL restrictions on land use have allowed for development of pre-European settlement conditions in plant communities on most of the Reserve, but potential exists for future degradation. Under current management new power lines, pipelines and mineral material pits may be developed, all roads and tracks remain in use, insufficient effort is made for weed control, non-endemic plants are imported, livestock concentration areas remain degraded, livestock graze in unauthorized areas, no riparian vegetation exists, and fire suppression minimally considers ecological resources. With no change in management, the sagebrush steppe communities on the Reserve would likely degrade in the long-term.

**Alternative 3:** Most management actions under this alternative are the same as under Alternative 1 with slightly more roads being limited to only authorized research vehicles. The major difference between the alternatives is the potential to purchase and retire grazing permits from operators willing to sell. In spite of any intensive management that could be implemented, livestock compete with wildlife for forage and water, they import and spread weeds, they destroy native plants where they concentrate and they negatively affect riparian zones. Typically, livestock reduce fire hazard by removal of fine fuels, but the light grazing on the Reserve is insufficient to realize this benefit. Removal of livestock grazing would remove many threats to the native sagebrush steppe ecosystems and potentially benefit native plant communities the most.

**Alternative 4:** Management actions under this alternative to increase weed control efforts, restore livestock concentration areas, and reestablish riparian, in combination, would provide increased protection of sagebrush steppe plant communities. Increasing livestock grazing, while potentially reducing fine fuels and fire spread in the short-term, would likely cause increased cheatgrass spread in the long-term as would heavier application of fire suppression tactics. These would lead to less protection of sagebrush steppe than both Alternatives 1 and 3.

## **4.4 Effects of Alternatives on Wildlife Habitat**

### **4.4.1 Management Considerations**

DOE policy is to manage all land and resources under the principles of ecosystem management and sustainable development (DOE, 1994). This philosophy directs management toward maintaining habitats rather than managing specific wildlife species. By maintaining the sagebrush steppe plant communities in good condition the wildlife species using them are also provided for.

The bald eagle is the only listed (Threatened) species documented on the Reserve, where use is primarily during the winter months. These large birds are often seen perching on power poles and rely mainly on carrion while on the Reserve. Historic bald eagle use of the Reserve was likely limited to the few cottonwood trees that lined the Birch Creek channel before the creek diversion in the early 1900s.

Returning any of the water from the Birch Creek Hydropower diversion to the Reserve would benefit wildlife habitat by re-establishing some riparian on the Reserve. The amount re-established and degree of benefit to wildlife would depend upon specific location of the reintroduced flows and the timing and volume of water returned.

Management to protect the habitat of sagebrush dependent species is important to reduce the chances that these species become listed as Threatened or Endangered. Sage grouse have received the most attention and guidelines for habitat management have been published (Connelly et al., 2000). The guidance contained in these guidelines has been incorporated into management actions throughout this management plan and is presented in Appendix 2.

Research has shown that raptor densities increase following construction of power transmission lines, especially in open areas such as the INEEL (APLIC, 1996). The structures increase perching, roosting and/or nesting habitat for a variety of birds, including special status raptors such as the bald eagle, golden eagle, ferruginous hawk, great horned owl and red-tailed hawk. The increased numbers of predators is likely putting increase pressure on the prey populations, including many special status species. The Reserve has approximately 31.5 miles of active high voltage power lines. There is also one abandoned line along Lincoln Boulevard with approximately 16 poles remaining and two artificial nesting structures.

#### 4.4.2 Effects of Alternative 1 (The Proposed Action)

**Lands and Minerals:** Eliminating all new ROWs and mineral material development would benefit wildlife species on the Reserve by retaining native vegetation, minimizing weed invasion, the level of human activity and creation of new raptor perches at potential sites. This would affect at least 200 acres of permitted material sites and an undetermined potential development area. Societal demands for these developments would likely result in their effects being displaced to other areas.

**Roads:** Limiting access to only authorized research vehicles on 154 miles (59%) of unpaved roads would reduce use and soil disturbance due to road maintenance. Habitat fragmentation, human disturbance and lost native vegetation would decrease over time as vegetation reestablishes on the road surfaces. Ferruginous hawks would particularly benefit from the lower levels of human disturbance.

**Noxious and Invasive Plants:** Establishment of an IWM program would reduce total acres of noxious and invasive plants and their effects on wildlife habitat relative to Alternative 2. In addition, vehicle washing and replacement of some crested wheatgrass stands under this alternative would minimize the negative effects of invasive plants on wildlife habitat relative to the other alternatives.

**Revegetation:** The effects of requiring mostly local plants for revegetation on wildlife habitat quality are undetermined, but retaining only endemic species and avoiding possible long-term changes to the native plant communities would not diminish long-term wildlife habitat quality. Slower plant establishment on revegetation projects would temporarily reduce habitat quality for longer periods of time, but this is not expected to affect large acreages.

**Livestock:** Addition of 12.4 miles of boundary fence would keep livestock in the Wigwam Butte Allotment. This would reduce weed spread by livestock in lower Birch Creek and eliminate competition for forage with elk in that area. The fence would have some effect on pronghorn and deer movement, but this would be minimized by fence design. Requiring certified weed-free hay would also reduce importation of weeds. Restoration of some livestock concentration areas would reduce the threat of weed invasion and improve wildlife habitat by an amount proportional to the acres restored. This alternative would provide the most benefits to wildlife due to livestock management actions, unless grazing permits were to be retired as under Alternative 3.

**Wildlife habitat:** Eliminating the use of raptor perches on active and inactive power poles would reduce habitat for many perching birds, including bald eagles, golden eagles, ferruginous hawks, great horned owls and red-tailed hawks. Habitats for all of these special status species would return to levels that existed prior to power line construction. Prey populations, also including many special status species, would be provided more opportunity to increase. These affects are the same for Alternatives 1 and 3.

**Surface water:** Returning winter Birch Creek flows to the lower channel would replace an unknown amount of sagebrush community with riparian vegetation. This would likely encompass a few tens of acres loss of sagebrush and gain of riparian. The added riparian would benefit a wide variety of wildlife species in proportion to the amount of riparian created.

**Wildfire:** Formation of the Reserve Management Committees and use of Resource Advisors under Alternatives 1, 3, and 4 would improve monitoring, mitigation of fire and fire suppression impacts, and awareness of Reserve resource values relative to Alternative 2. Application of prioritized MIST under this alternative would result in lighter application of fire suppression tactics on some fires, less soil disturbance and cheatgrass spread, and less habitat fragmentation than under Alternatives 2 and 4. However, lighter application of suppression tactics could also result in more total acres burned, wildlife habitat altered and sagebrush destroyed in the near-term. The lower amounts of soil disturbance and the



accompanying reduced cheatgrass spread could result in smaller, less frequent fires in the future. Leaving unburned islands of vegetation within fire containment lines would enhance reestablishment of wildlife habitat within burned areas relative to Alternative 2, but may result in some fires escaping beyond containment lines.

#### **4.4.3 Effects of Alternative 2 (No Action)**

**Lands and Minerals:** Potential exists for at least 200 acres of mineral material development and an unknown amount of ROW development. Human caused disturbance and loss of wildlife habitat would continue on the areas disturbed by these projects. **Impacts of these actions would not be displaced elsewhere.**

**Roads:** Habitat fragmentation due to roads, disturbance of wildlife by vehicles, and increased potential for weed invasion would remain on all 259 miles of roads. This is the same under Alternatives 2 and 4.

**Noxious and Invasive Plants:** The current INEEL weed program would reduce, but not minimize, impacts from weeds to wildlife habitat. No management addressing non-noxious invaders, including crested wheatgrass or cheatgrass, is conducted. No vehicles are washed prior to entering the INEEL. This alternative would result in the greatest degradation of wildlife habitat by invasive plants.

**Revegetation:** The possible long-term changes to the native plant communities due to introduction of non-endemic plants may diminish habitat quality, but the effects on wildlife are uncertain. Revegetation rates would be faster under this alternative due to faster establishment of commercial cultivars, but this is not expected to affect large acreages.

**Livestock:** The existing boundary fence between Wigwam and Mahogany Butte Allotments is insufficient to control livestock movement. Existing stock water tanks on adjacent BLM land has likely benefited wildlife as there is no perennial water on the Reserve. Habitat quality has been degraded at the livestock concentration areas and while these do not cover significant acreages, they do provide scattered locations favorable for weed invasion. There have been no limits placed upon imported feed quality and it is unknown if weeds have been imported with stock feed.

**Wildlife habitat:** No active power lines have been modified to eliminate raptor perching. The Reserve contains approximately 31.5 miles of active high voltage power lines with about 230 support structures. Approximately 16 additional unused, unmodified power poles are on the Reserve with two of these containing artificial nesting platforms.

**Surface water:** Winter return flows for the Birch Creek Hydropower provide water when availability is not critical to wildlife and the ditch supports no riparian vegetation. Current benefits for wildlife on the Reserve are minimal.

**Wildfire:** The INEEL Wildland Fire Management Committee would provide over-site of wildfire activities without the benefit of a Reserve Management Committee or Resource Advisors. This would result in the lowest degree of awareness of Reserve resources during and after wildfire suppression activities. Application of MIST under this alternative, would be at the discretion of incident commanders without the advise of Resource Advisors, would likely result in a heavier application of fire suppression tactics, more soil disturbance and cheatgrass spread, and more habitat fragmentation than under Alternatives 1 and 3. However, heavier application of suppression tactics could also result in fewer acres burned, wildlife habitat altered and sagebrush destroyed in the short-term. The higher amounts of soil disturbance and the accompanying cheatgrass spread could result in larger, more frequent fires in the

future. Burning out unburned islands of vegetation within fire containment lines would remove sources of seed for natural reestablishment of wildlife habitat within burned areas, but would reduce the chances for some fires escaping beyond containment lines.

#### **4.4.4 Effects of Alternative 3 (Enhanced Natural Resource Protection)**

Management actions proposed for **Lands and Minerals, Noxious and Invasive Plants, Revegetation, Wildlife Habitat, Surface water and Wildfire** under this alternative would have the same effects as under Alternative 1.

**Roads:** Limiting access to only authorized research vehicles on 165 miles (64%) of unpaved roads would reduce road use and soil disturbance due to road maintenance. Weed spread would be reduced by proportional amounts. This alternative would limit use of more miles than any other alternative.

**Livestock:** In the near-term, this alternative would have the same effects as Alternative 1. However, in the long-term, retiring grazing permits would remove all conflicts with wildlife due to livestock grazing on the Reserve.

#### **4.4.5 Effects of Alternative 4 (Enhanced Opportunity for Resource Extraction)**

Management actions proposed for **Revegetation and Surface water** under this alternative would have the same effects as under Alternative 1.

Management actions proposed for **Lands and Minerals and Roads** under this alternative would have the same effects as under Alternative 2.

**Noxious and Invasive Plants:** Implementation of IWM would reduce the acreage of weed infestation relative to Alternative 2, but with no requirements for vehicle washing, new weed infestations would be more frequent than under Alternatives 1 and 3. Crested wheatgrass stands would continue to spread as under Alternative 2. This alternative would result in greater degradation of wildlife habitat by invasive plants than Alternatives 1 and 3, but less than Alternative 2.

**Livestock:** Increasing stocking levels on three of the four allotments would increase conflicts with wildlife on approximately 24% of the Reserve. The size of the livestock concentration areas would increase. Competition for forage and increased spread of weeds and cheatgrass would degrade wildlife habitat conditions. Implementation of herding of cattle on the Sinks and Wigwam Butte Allotments, or 19% of the Reserve and completing fencing of the allotment boundary would partially mitigate these impacts. Requiring certified weed-free hay would be particularly important under this alternative due to increased presence of herders on the cattle allotments.

**Wildlife habitat:** With no modification of active power lines, raptors would continue to use the poles as in Alternative 2. Removal of abandoned power poles would reduce predation by raptors near the 16 unused power poles along Lincoln Boulevard.

**Wildfire:** Formation of the Reserve Management Committee and use of Resource Advisors under Alternative 1, 3, and 4 would improve monitoring and mitigation of fire and fire suppression impacts relative to Alternative 2. This would also ensure a higher level of awareness of Reserve resources among fire suppression personnel. Use of Resource Advisors would help locate containment lines to minimize direct impacts to high value resources, but without the application of MIST under this alternative, there would be heavier application of fire suppression tactics to keep fires small. This would allow for more soil disturbance, cheatgrass spread, and habitat fragmentation than under Alternatives 1, 2 and 3, but potentially less destruction of critical habitats than under Alternative 2. The higher amounts of soil

disturbance and the accompanying cheatgrass spread could result in larger, more frequent fires in the future. Leaving fewer unburned islands of vegetation within fire containment lines would slow reestablishment of wildlife habitat within burned areas, but may result in fewer fires escaping beyond containment lines than under Alternative 1 and 3.

#### **4.4.6 Summary of Effects on Wildlife Habitat**

**Alternative 1:** Management actions under this alternative to reduce road use, increase weed control efforts, restore livestock concentration areas, reestablish riparian, and minimize soil disturbance by wildfire suppression would, in combination, provide increased protection of wildlife habitat. The reduction of perching habitat would reduce habitat for a number of species, including the threatened bald eagle, but prey species, including sage grouse would benefit. Large numbers of power poles remain available to perching species within the region, but outside of the Reserve. Addition of approximately 12.4 miles of fence would affect pronghorn and deer movement and may slightly increase mortality. This alternative would not provide as much protection of wildlife habitat as Alternative 3.

**Alternative 2:** Existing INEEL restrictions on land use have lead to sagebrush steppe ecosystems in near pre-European settlement conditions on most of the Reserve, but potential exists for future degradation. Under current management, new power lines, pipelines and mineral material pits may be developed, all roads and tracks remain in use, insufficient effort is made for weed control, non-endemic plants are seeded, livestock concentration areas continue in degraded condition, power lines attract unnatural numbers of predators, no riparian exists, and fire suppression minimally considers ecological resources. With no change in management, the habitat value of the Reserve would likely degrade in the long-term.

**Alternative 3:** Most management actions under this alternative are the same as under Alternative 1. Slightly more miles of road would be limited to research access only, but the major difference is the potential to purchase and retire grazing permits through voluntary relinquishment. In spite of any intensive management that could be implemented, livestock compete with wildlife for forage and water, they import and spread weeds, and they destroy native plants at concentration areas. Livestock typically reduce fire hazard by removal of fine fuels, but the degree of grazing on the Reserve is too low to realize this benefit. Removal of livestock grazing from the Reserve would remove many potential threats to the sagebrush steppe habitat that currently exist. This alternative would provide the highest degree of protection to wildlife habitats.

**Alternative 4:** Management actions under this alternative to increase weed control efforts, restore livestock concentration areas, and reestablish riparian, in combination would provide much habitat protection. However, increasing livestock grazing and using more aggressive fire suppression tactics would reverse most of these benefits resulting in less protection of wildlife habitat than under Alternatives 1 and 3.

### **4.5 Effects of Alternatives on Soils and Air Quality**

#### **4.5.1 Management Considerations**

Wildfire, and its aftermath, are the most significant factor affecting air quality on the Reserve. Emissions of smoke during the fire and production of dust from landscapes denuded by fire and fire containment lines all have significant impacts on air quality. In addition to health hazards posed by dust inhalation, high levels of dust production also clogs air filtration systems at INEEL facilities and limits public visibility on Highways 22, 28, and 33. Particulate weekly concentrations as high as

500 micrograms per cubic meter of air have been measured at the Test Reactor Area in dust following wildfire. This compares to 25 microgram per cubic meter for a typical weekly average (DOE, 2002).

Fire containment lines remove all combustible plant material, leaving bare soil vulnerable to wind erosion. Under severe burning conditions, dozer lines of one or several blade widths can lead to significant areas being prone to dust production. While minimizing the size of fires will reduce the potential for dust production, over construction of fire containment lines can also increase dust production, but generally not as much as large burned areas.

The fine textured loess and lacustrine derived soils common on the Reserve are highly prone to accelerated wind erosion when disturbed. Erosion rates of 200 tons/acre/year are typical for measurements conducted by the BLM on burned land in and around the INEEL (DOE, 2002). While this erosion rate far exceeds annual rates of soil formation for the Reserve, natural fire return intervals of over 50 years would allow for replenishment of soils during the long fire-free period. With the spread of cheatgrass and the resulting reduction of fire intervals, fire free periods become shorter and episodes of severe erosion become more frequent. In the long-term this reduces soil productivity and the ability of the site to support vegetation.

In their undisturbed state, soils on the Reserve are covered with either vascular plants or microbiotic crusts. Also known as biological, cryptogamic, cryptobiotic, or microphytic soil crusts, these nonvascular plant communities occupy areas between established vascular plants which would otherwise be bare (Belnap et al., 2001). The crusts function as living mulch by retaining soil moisture, reducing soil erosion, fixing nitrogen and contributing to soil organic matter content (Eldridge and Green, 1994). Microbiotic crusts are easily destroyed by human activity and once removed require several years to reform.

Protecting soils and minimizing dust production requires maintenance or reestablishment of vegetative cover. In addition to fire, displacement of native plants by weeds, localized concentrated grazing, roads, off road driving and mineral material development sites all increase the potential for accelerated wind erosion and dust production. Management of these to limit the extent and duration of soil disturbance minimizes the potential for wind erosion and dust production.

#### **4.5.2 Effects of Alternative 1 (The Proposed Action)**

**Lands and Minerals:** Eliminating new mineral material sites or ROW developments would eliminate potential new sources of soil erosion and dust production. Restoration of some existing pits and ROWs would reduce the potential for dust production created on some roads and mineral material pits.

**Roads:** Limiting access to only authorized research vehicles on 154 miles (59%) of unpaved roads would reduce road use and soil disturbance due to road maintenance. This would increase vegetative cover and reduce soil erosion rates and dust production. This alternative limits access on fewer miles than Alternative 3, but more than Alternative 2 and 4.

**Noxious and Invasive Plants:** Most species of noxious weeds provide insufficient vegetative cover to protect soils from accelerated erosion and dust production. Implementation of IWM and vehicle washing requirements under this alternative and Alternative 3 would result in the minimum acres of weed infestation and potential for accelerated erosion and dust production.

**Revegetation:** Restricting species to local genotypes would likely delay plant reestablishment on some restoration projects. This would allow for more erosion and dust production than under Alternatives 2 and 4. Allowing for the use of all authorized species would reduce this effect in rare situations.

**Livestock:** Restoration of problem livestock concentration areas would reduce soil erosion and dust production by an amount proportional to the acreage restored. Completion of boundary fencing between Wigwam and Mahogany Butte Allotments would reduce livestock use of unauthorized areas and reduce cheatgrass and weed spread. This would reduce the chances of fire and the accompanying smoke, accelerated soil erosion and dust production in that area relative to Alternative 2.

**Wildlife habitat:** Wildlife management actions proposed under this alternative would have no effect on soils or air quality.

**Surface water:** Returning a portion the power plant outflows to the Birch Creek channel has the potential to increase noxious weed infestations along the creek, leaving infested areas prone to erosion and dust production. Implementation of IWM would minimize this weed spread equally under Alternatives 1, 3, and 4.

**Wildfire:** Use of the Reserve Management Committee and Resource Advisors on fires would improve monitoring and mitigation of fire and fire suppression. These actions would also increase awareness of Reserve resources relative to Alternative 2. Application of prioritized MIST under this alternative would result in lighter application of fire suppression tactics than Alternatives 2 and 4. This would reduce soil disturbance due to fire containment lines and the accompanying cheatgrass spread. While this could cause more total acres burned, soil erosion and dust production in the near-term, the long-term result could be smaller fires due to less cheatgrass spread.

#### **4.5.3 Effects of Alternative 2 (No Action)**

**Lands and Minerals:** Continued development of mineral material sites and ROWs would increase the amount of ground surface disturbed by these activities. This would allow increased accelerated soil erosion and dust production proportional to the acreage affected.

**Roads:** Currently, all 259 miles of unpaved roads and tracks are used by INEEL staff. Road maintenance levels, weed spread rates, soil erosion rates and dust production would remain at current rates.

**Noxious and Invasive Plants:** While some spraying is conducted, current levels of weed control on the Reserve do not minimize weed infestations. There is also no limitation on off-road and construction vehicles carrying weed seeds onto the Reserve. With no change in management, larger weed infestations would cause more accelerated soil erosion and dust production than under Alternatives 1 and 3.

**Revegetation:** Revegetation of disturbances on the Reserve would continue to allow the use of commercially available seed cultivars, minimizing the cost and increasing the speed of revegetation projects relative to Alternatives 1 and 3. This would reduce the potential for restored areas to remain bare to be vulnerable to accelerated soil erosion and increased dust production.

**Livestock:** The existing fence between Wigwam Butte and Mahogany Butte Allotments allows cattle to access the Mahogany Butte Allotment and the non-grazed area. Birch Creek now contains significant amounts of cheatgrass which, if spread, would increase the chances of fire and the accompanying smoke, accelerated soil erosion and dust production in that area.

**Wildlife habitat:** Wildlife management actions proposed under this alternative would have no effect on soils or air quality.

**Surface water:** Keeping the winter power plant return flows in the existing ditch would minimize, but not eliminate, the spread of noxious weed seeds from this source on the Reserve. Continuing to direct the entire flow to the T-28 North gravel pit would continue to increase the volume of water leaving the pit and continued construction of water spreading structures outside of the Reserve. The soil and plant disturbance outside of the Reserve would increase the potential for soil erosion and dust production in that area.

**Wildfire:** The newly created INEEL Wild Land Fire Management Committee would improve monitoring and mitigation of fire and fire suppression impacts. However, with no Resource Advisors under this alternative, Incident Commanders would not have the benefit of the additional knowledge base provided. This would likely lead to heavier application of suppression tactics, increasing soil disturbance relative to the other Alternatives. In the short term, this would likely result in fewer total acres burned, accelerated soil erosion and dust produced. However, in the long-term, the increased soil disturbance would likely increase the spread of cheatgrass, causing larger and more frequent fires in the future.

#### **4.5.4 Effects of Alternative 3 (Enhanced Natural Resource Protection)**

Management actions proposed for **Lands and Minerals, Noxious and Invasive Plants, Revegetation, Surface water** and **Wildfire** under this alternative would have the same effects as under Alternative 1.

**Roads:** Limiting access to only authorized research vehicles on 165 miles (64%) of unpaved roads would reduce use and soil disturbance due to road maintenance. Reducing road use would increase vegetative cover and reduce soil erosion rates and dust production. This alternative limits road use the most.

**Livestock:** In addition to the benefits identified under Alternative 1, retirement of livestock permits would further reduce accelerated soil erosion and dust production. All livestock concentration areas and stock trails would revegetate, noxious weeds and cheatgrass would spread at slower rates, and vehicle traffic would be lower to non-existent on many roads without the permittees tending their herds.

**Wildlife habitat:** Wildlife management actions proposed under this alternative would have no effect on soils or air quality.

#### **4.5.5 Effects of Alternative 4 (Enhanced Opportunity for Resource Extraction)**

Management actions proposed for **Revegetation** and **Surface water** under this alternative would have the same effects as under Alternative 1.

Management actions proposed for **Lands and Minerals** and **Roads** under this alternative would have the same effects as under Alternative 2.

**Noxious and Invasive Plants:** No implementation of controls on vehicles entering the Reserve would allow weed importation to continue from this source.

**Livestock:** Increasing livestock stocking to the maximum allowable would cause this alternative to have the highest impacts to soils and air quality due to livestock. The area covered by stock concentration areas would likely increase, and noxious weeds and cheatgrass would likely spread faster.

**Wildlife habitat:** Wildlife management actions proposed under this alternative would have no effect on soils or air quality.

**Wildfire:** Use of a Resource Advisor under this alternative would result in less impact to Reserve ecological and cultural resources than under Alternative 2, but heavier application of suppression tactics than under Alternatives 1 and 3. In the short-term, this alternative would likely result in fewer acres burned and less accelerated soil erosion and dust production than under Alternatives 1 and 3, because of heavier use of suppression tactics and smaller fires. However, in the long-term, with increased disturbance due to fire suppression and the resulting increased cheatgrass spread, this alternative could lead to larger and more frequent fires.

#### **4.5.6 Summary of Effects on Soils and Air Quality**

**Alternative 1:** Management actions under this alternative to reduce road use, increase weed control efforts, restore livestock concentration areas, control livestock distribution and minimize soil disturbance by wildfire suppression would, in combination, increase protection of plants and soil surfaces, but not as much as under Alternative 3. With the exception of large fires, the disturbances on the Reserve produce small amounts of dust relative to the cultivated lands both east and west of the INEEL. Most changes on the Reserve would therefore have little effect on regional air quality. Should a large fire occur on the Reserve, large amounts of dust could be temporarily produced from the burned area and degrade regional air quality. The chances for large fires are higher in the near-term, but lower in the long-term under this alternative, relative to Alternatives 2 and 4.

**Alternative 2:** With the exception of large fires, the disturbances on the Reserve produce small amounts of dust relative to the cultivated lands both east and west of the INEEL and have little effect on regional air quality. Under current management, new power lines, pipelines and mineral material pits may be developed, all roads and tracks remain in use, insufficient effort is made for weed control, livestock concentration areas continue as degraded habitat, livestock distribution is not well controlled and fire suppression minimally considers ecological resources. With no change in management, the plant communities on the Reserve would likely degrade in the long-term with increased fire frequency and size, accelerated soil erosion and dust production.

**Alternative 3:** With the exception of large fires, the disturbances on the Reserve produce small amounts of dust relative to the cultivated lands both east and west of the INEEL. Most management actions under this alternative are the same as under Alternative 1. More miles of unpaved road have use limitations, but the major difference is the potential for voluntary relinquishment of grazing permits by willing sellers. In spite of any intensive management that could be implemented, livestock import and spread weeds and cheatgrass, and they create bare ground where they concentrate. Typically, livestock reduce fire hazard by removal of fine fuels, but the light grazing on the Reserve is insufficient to realize this benefit. Removal of livestock grazing from the Reserve would remove many potential threats to increase fire size and the amount of bare ground on the Reserve. The long-term potential for accelerated soil erosion and dust production would be the least under this alternative.

**Alternative 4:** With the exception of large fires, the disturbances on the Reserve produce small amounts of dust relative to the cultivated lands both east and west of the INEEL. Management actions under this alternative to increase weed control efforts and restore livestock concentration areas would provide increased protection of soils and reduce potential for dust production. However, increasing livestock grazing and heavier application of fire suppression tactics would reverse this resulting in less protection of plants and soils than both Alternatives 1 and 3.

## **4.6 Effects of Alternatives on Social and Economic Resources**

### **4.6.1 Management Considerations**

When considering natural resource issues, analysis of economic values offers a consistent measure in dollars for comparison of alternatives. However, the majority of natural resources on the Reserve such as tribal values, native plant communities, wildlife habitat and research opportunity are not easily quantifiable. It is usually these more nebulous values that are at the center of disagreement over allocations of natural resources. Conflicts between users of the Reserve are likely to occur as people value the same resources for different types of use, especially when one activity negatively impacts potential for other uses. Therefore, comparison of economic valuations is not a complete answer but is one consideration decision makers use to weigh alternatives and trade-offs when making decisions concerning natural resource allocations.

From early settlement in the 1880s until the passage of the Taylor Grazing Act in 1934, the Snake River Plane was heavily grazed by livestock. Historians document large numbers of horses, sheep, and later, cattle brought in by miners, ranchers, homesteaders and the Army (Oberg, 1970). The extent to which these practices changed the native vegetation on the INEEL is not known, but livestock grazing was conducted on a first come, first served basis with no limits during these times. The Taylor Grazing Act was enacted in 1934 “to stop injury to the public grazing lands by preventing overgrazing and soil deterioration.... [and].... to stabilize the livestock industry....” The Act created 50 grazing districts across the west, including the Birch Creek and Howe districts and established the Range Advisory Boards. In the early years, the General Land Office charged \$.05 for an AUM. During the adjudication process in the early 1960s, the Birch Creek and Howe grazing districts were divided into the present day allotments.

Many researchers have shown that economic benefits to local economies from grazing income are greater than the direct economic values derived from grazing on Federal allotments (Van Tassell and Richardson, 1998 and others). Taylor (2002) calculated values of \$60.56 for cattle AUMs and \$39.67 for sheep AUMs on Federal allotments in Uinta County Wyoming. This includes direct profits by producers and multipliers for their expenditures in the economy. In addition, each cattle AUM supported 0.000774 local jobs and each sheep AUM supported 0.000938 jobs. Using these numbers, the grazing on the Reserve provides the following values to local economies under the alternatives considered.

Annual income for the Federal Treasury is derived through leases for livestock grazing and ROWs on the Reserve. Leases for the Reserve portions of the four Federal allotments would generate the values shown in Table 9. The Reserve portion of the 230 KV Utah Power and Light power line and the two buried fiber-optic lines rent for a total of approximately \$3,718.68 (BLM files). The INEEL power lines and the State highways pay no rental fees on Federal land.

High voltage 230 KV transmission lines cost between \$160,000 and \$200,000 per mile to construct. Requiring any potential new lines to route around the Reserve could add to construction costs. In addition, adding raptor protection devices to the existing line would cost approximately \$1,000 per pole or a total of \$81,000. These increased costs would be passed on to regional power consumers through slight increases in utility costs.

Portions of the Reserve are open to big game hunting by the public. The generally accepted value to the economy of this activity is \$44.12 per hunter-day (ASA 1996). There are no records of the number of hunter-days generated by the Reserve.



**Table 9. Economic values of livestock grazing by alternative.**

		Wigwam Butte (Cattle)	Sinks (Cattle)	Twin Buttes (Sheep)	Mahogany Butte (Sheep)	Totals
Alternative 1	Active AUMs	642	253	263	471	1629
	Annual Federal Receipts	\$808.92	\$318.78	\$331.38	\$593.46	\$2,052.54
	Total value added	\$38,879	\$15,321	\$10,433	\$18,684	\$83,317
	Jobs supported	0.50	0.20	0.25	0.44	1.39
Alternative 2	Active AUMs	642	253	263	471	1629
	Annual Federal Receipts	\$808.92	\$318.78	\$331.38	\$593.46	\$2,052.54
	Total value added	\$38,879	\$15,321	\$10,433	\$18,684	\$83,317
	Jobs supported	0.50	0.20	0.25	0.44	1.39
Alternative 3	AUMs with retirement of grazing permits	0	0	0	0	0
	Annual Federal Receipts	0	0	0	0	0
	Total value added	0	0	0	0	0
	Jobs supported	0	0	0	0	0
Alternative 4	AUMs at full preference	686	342	313	471	1812
	Annual Federal Receipts	\$864.36	\$430.92	\$394.38	\$593.46	\$2,283.12
	Total value added	\$41,544	\$20,711	\$12,416	\$18,684	\$93,355
	Jobs supported	0.53	0.26	0.29	0.44	1.52

**4.6.2 Effects of Alternative 1 (The Proposed Action)**

**Lands and Minerals:** Eliminating new mineral material sites within the Reserve would increase haul distances and costs for highway maintenance projects conducted within the Reserve. Eliminating new utility ROWs on the Reserve would require utility companies to route any future power lines around the Reserve, potentially increasing their costs. Opportunities to generate additional Federal lease rental fees from ROWs on the Reserve would be forgone.

**Roads:** Limiting access to only authorized research vehicles on 154 miles (59%) of unpaved roads may increase operating costs for grazing permittees by limiting vehicle access to their herds. This increase would be the most for the sheep herders on the Mahogany Butte Allotment. Less than 2% of the Twin Buttes Allotment is on the Reserve, so herding costs would be minimally affected there. Potential for increased permittee costs would be minimized by using horses for herding. Hunter days on the Reserve may decrease slightly due to fewer road miles available. Road maintenance costs for the INEEL would be reduced with fewer miles of roads remaining in use.

**Noxious and Invasive Plants:** Implementation of IWM would increase short-term operating costs for the INEEL, but could provide additional jobs for local qualified weed control personnel. Requiring off-road and construction vehicles to process through the bus washing station would increase costs for

vehicle operators and INEEL staff at the wash facility. Long-term increases in weed control costs would be less due to less weed expansion than under Alternative 2.

**Revegetation:** Generally requiring use of only locally collected seeds and transplants would increase the costs of revegetation projects for the INEEL several fold, relative to Alternatives 2 and 4. Development of a local seed collection industry could add diversity to the economy and create additional job opportunities.

**Livestock:** Retaining current livestock numbers would continue to contribute \$83,317 per year to the local economy and \$2,052 in Federal grazing receipts. This is the same as Alternative 2, but more than Alternative 3 and less than 4. Extension of the boundary fence between Wigwam Butte and Mahogany Butte Allotments would cost approximately \$5,000 per mile or a total of \$62,000. Fence maintenance costs would increase for the permittees.

**Wildlife habitat:** Addition of devices to prevent raptor perching on active power poles could cost approximately \$1,000 per pole or \$159,000 total. Of this, approximately 51% would be on the privately owned line, with the remainder being a cost to the INEEL. Removal of artificial raptor perch platforms and other inactive power poles would cost INEEL approximately \$4,000 to \$5,000, but would have little effect on the local economy.

**Surface water:** Diverting a portion of the Birch Creek Power return flows would cost INEEL an undetermined amount depending upon the type of system designed. These cost increases would be partially offset by reduced costs for water diversions below the T-28 Pit. All of this work would be on the INEEL and not affect the local economy.

**Wildfire:** Incident Commanders are more likely to consider using MIST with a Resource Advisor present. Relative to Alternatives 2 and 4, emphasizing the use of the MIST could cause some fires to be larger in the near-term, but smaller in the long-term due to less cheatgrass spread. The chances for power line destruction, fire spread to adjacent lands and loss of livestock forage would also be higher in the near-term, but lower in the long-term. Using MIST could also decrease noxious weed control costs in the long-term. Increases or decreases in fire suppression costs could affect local economies through changes in hiring of fire fighters and local purchase of supplies.

#### **4.6.3 Effects of Alternative 2 (No Action)**

**Lands and Minerals:** Applications for mineral material permits and ROWs would continue to be processed. Highway project costs within the Reserve would not be affected by gravel availability.

**Roads:** With no restrictions on authorized road uses, income and costs would not change for livestock herding, road maintenance and hunting.

**Noxious and Invasive Plants:** Weed control would continue to be done as INEEL budgets allow. No money is expended to wash vehicles entering the INEEL. The short-term cost savings would likely lead to long-term increased costs of weed control and fire suppression due to weed and cheatgrass spread.

**Revegetation:** Allowing the use of commercially grown cultivars of native species would minimize the costs to the INEEL of revegetation projects under this and Alternative 4.

**Livestock:** Retaining current levels of livestock grazing would continue to add \$83,317 per year to the local economy and \$2,052 in Federal grazing receipts. This is the same as Alternative 1, more than Alternative 3 and less than under Alternative 4. Operating costs for permittees would not change.

**Wildlife Habitat:** Wildlife management activities on the Reserve currently have little or no effect on local economies.

**Surface water:** Leaving the Birch Creek Power return flows in the existing ditch would cause increases in the long-term INEEL costs for weed control and flood prevention.

**Wildfire:** While Incident Commanders are required to consider using MIST, they may be more likely to use heavy-handed suppression methods without a Resource Advisor. With less use of MIST, fire sizes would likely be smaller in the near-term relative to Alternatives 1 and 3, but larger in the long-term with increased cheatgrass spread. Therefore, under this alternative, the chances for power line destruction, fire spreading onto adjacent lands and loss of livestock forage would be lower in the near-term, but higher in the long-term. Increases or decreases in fire suppression costs could affect local economies through changes in local purchase of supplies and contracting.

#### **4.6.4 Effects of Alternative 3 (Enhanced Natural Resource Protection)**

Management actions proposed for **Lands and Minerals, Noxious and Invasive Plants, Revegetation, Wildlife Habitat, Surface water and Wildfire**, under this alternative, would have the same effects as under Alternative 1.

**Roads:** Limiting access to only authorized research vehicles on 165 miles (64%) of unpaved roads would reduce use the most, under this alternative, with economic effects potentially being the highest. Costs for access to livestock herds would increase slightly. This increase would be the most for sheep herders on the Mahogany Butte Allotment. Herding with horses could partially off set these increases. Road maintenance costs for the INEEL and hunter access would be reduced the most under this alternative.

**Livestock:** Retaining current levels of livestock grazing would continue to add \$83,317 per year to the local economy and \$2,052 in Federal grazing receipts. If the permittees offer to sell their permits to the Federal Government, these receipts would drop to \$0. At \$60/AUM, retiring the Reserve portions of the permits would cost approximately the Federal government \$99,024 and this amount would be infused into the local economy by the permittees. Extension of the boundary fence between Wigwam Butte and Mahogany Butte Allotments would cost approximately \$5,000 per mile or a total of \$62,000, unless the permits are sold. Operating costs on the two cattle allotments would increase due to additional fence maintenance requirements, but there would also be fewer cattle lost on the highways. Purchase of these permits would reduce annual grazing receipts received by the Federal Government by approximately \$2,052.00 (\$1.26/AUM) per year.

#### **4.6.5 Effects of Alternative 4 (Enhanced Opportunity for Resource Extraction)**

Management actions for **Roads and Revegetation** under this alternative would have the same effects as under Alternative 2.

**Lands and Minerals:** Mineral material permits and ROWs continue to be processed, but consider potential for impacts to the goals and objectives of the Reserve.

**Noxious and Invasive Plants:** Implementation of IWM would increase short-term operating costs for the INEEL, but could potentially provide additional jobs for qualified weed control personnel. Long-term weed control costs would be lower than under Alternative 2, but higher than Alternatives 1 and 3 due to increased weed introduction on vehicles. No additional short-term costs would be required for washing of vehicles entering the INEEL under this alternative.

**Livestock:** Increasing grazing levels to the full preference would increase income to the local economy by about \$10,038 and increase Federal grazing receipts by to about \$163. These are the highest of the alternatives. Operating costs for permittees on Wigwam Butts and Sinks allotments would increase due to increased herding needs.

**Wildlife Habitat:** Removal of inactive power poles would have little or no affect on the local economy.

**Surface water:** Impacts under this alternative are the same as under Alternative 1.

**Wildfire:** Aggressive fire suppression under this alternative would reduce the size of fires in the short-term, but may increase fire size in the long-term due to increased spread of cheatgrass. This could increase INEEL weed control and fire suppression costs in the long-term. These long-term increases would be greatest under Alternative 2 with the most aggressive suppression and less under Alternatives 1 and 3. The addition of a Resource Advisor under this alternative would reduce soil disturbance relative to Alternative 2. Increases or decreases in fire suppression costs could affect local economies through changes in local purchase of supplies.

#### **4.6.6 Summary of Effects on Social and Economic Resources**

**Alternative 1:** The impacts of management changes on the Reserve under Alternative 1 would have little effect on the regional agricultural economy. Income from livestock grazing would remain unchanged, but operating costs on the two cattle allotments would increase slightly due to 12.4 miles of additional fence maintenance requirements. Development of local seed collection practices could add diversity to the economy and create additional job opportunities. The potential for increases in Federal ROW lease receipts would be forgone on the Reserve, but routing power lines and pipelines around the Reserve on other public lands could actually increase Federal receipts due to longer ROWs. These increases, along with requirements for eliminating raptor use of towers could add slightly to regional power costs.

**Alternative 2:** With no changes in management on the Reserve, the affects on the regional economy would remain the same. This alternative would have the least impact on local economy, utility company and INEEL costs in the near-term, but INEEL costs for fire suppression and weed control would likely be highest in the long-term.

**Alternative 3:** Impacts to the regional economy could be the greatest under this alternative. If the permittees were to sell the grazing leases, the grazing removed from the Reserve could be moved to other Federal lands, State or private lands, or the operators could reduce the size of their operations. The resulting smaller operations may not be economical and some may go out of business. These changes would affect only the permittees in Wigwam Butte, Sinks and Mahogany Butte Allotments, with a total of five operators. The 15 operators on the Twin Buttes Allotment would likely not be affected due to the low proportion (less than 2%) of this allotment being on the Reserve. In the worst case, if all of the 5 permittees went out of business, their operations would be sold to other operators that would add the private land and attached remaining Federal leases to their operations. This would result in a loss to the local economy of the income now derived from grazing on the Reserve or approximately \$83,317 annually and 1.14 full time jobs. Development of local seed collection industry could add additional job opportunities. The potential for increases in Federal ROW lease receipts would be forgone on the Reserve, but routing power lines and pipelines around the Reserve on other public lands could increase Federal receipts due to longer ROWs. These increases, along with requirements for eliminating raptor use of towers could add slightly to regional power costs.

**Alternative 4:** This alternative has potential to increase inputs to the local economy by the highest amount. Income from grazing would increase by about \$10,000 per year and there would be no potential effect on regional power costs. The opportunity for development of local seed collection industry would be forgone.

## **4.7 Effects of Alternatives on Ecological Research Opportunities**

### **4.7.1 Management Considerations**

Ecological research opportunities on the Reserve are dependent upon conserving the plant and wildlife communities and making them available for study. Management to preserve the native flora and fauna of the Reserve is inherent to most provisions of this plan. Significant threats to these communities include invasion by non-native plants, outright killing of native plants by construction and environmental clean-up activities, wildfire and fire suppression, off-road vehicle travel and poor distribution of livestock. Management to reduce these threats is necessary to ensure continued existence of the pre-European settlement conditions now present on the Reserve.

Because of the size and complexity of the Reserve, reasonable vehicle access is essential for conducting cost effective and efficient research. In addition, safety and security aspects of working at a DOE national laboratory require that field workers be able to quickly leave the area should this become necessary.

Impacts of the alternatives on Ecological Research Opportunities are the same as those analyzed under Section 4(C), Effects of Alternatives on Native Plant Communities. Refer to that section for analysis of impacts.

## **4.8 Cumulative Impacts**

Cumulative impacts are the incremental effects caused by management actions considering all other past, present, and reasonably foreseeable future actions affecting a resource. These can result from individually minor but collectively significant actions taken over time and the effects can be either additive or subtract from the effects of other actions.

The effects of managing to preserve native sagebrush steppe ecosystems in this plan reverse the effects of many years of sagebrush steppe conversion and degradation. Eliminating new gravel pits and ROWs, limiting road use and maintenance, purchasing and retiring grazing permits, eliminating non-endemic plants, creating new un-grazed riparian zones, and limiting fire suppression methods all would reverse long-term region trends, if implemented. It is unlikely that any of these measures would represent an incremental portion of a larger change that would affect regional resources significantly.

Power poles that have created habitat for perching birds, including several special status raptor species, could be modified throughout the region with actions implemented on the Reserve being an incremental portion. The Sage Grouse Management Guidelines (Connelly et al., 2000; Appendix 3) recommends this course of action in sage grouse habitat. In addition, newly constructed power lines in Wyoming have been required to comply (Utah Power and Light, personal communication).

## 4.9 Mitigation Measures

1. Collection of native seeds and plants for rehabilitation projects would be done in a dispersed manner to minimize impacts to individual plant populations.
2. **Adaptive management would be conducted by the Reserve Long-Term Management Committee with changes in management direction implemented as necessary.**

## 4.10 Residual Impacts

1. Where non-paved roads and tracks remain open for use, invasive plants would continue to spread, and soil erosion and dust production would continue. These negative impacts could be exacerbated by road maintenance and would have the most effect under Alternatives 2 and 4, less under Alternative 1, and the least under Alternative 3.
2. In spite of all measures taken during herbicide application, some degree of damage to non-target plant species can be expected.
3. Reproduction of plants in areas used for seed collection could be reduced.
4. Wherever fences are added, there would be increased risk for big game entanglement in the fence and minor increases in hazards to birds. These risks would be greatest under Alternatives 1, 3 and 4 and smallest under Alternative 2.
5. Where unused power poles are removed, **or made unusable by installation of perching elimination devices**, non-predator perching birds would also lose habitat.

## **5. CONSULTATION AND COORDINATION**

### **5.1 Consultation**

During the scoping phase of the project comments were received from: Birch Power—Ted Sorenson, hydropower plant; Idaho Department of Parks and Recreation—Rick Collignon, Director; Committee for Idaho's High Desert and Western Watersheds—Katie Fite and Jon Marvel; INEEL Citizen Advisory Board—David Kipping; Garth Soderquist—Mud Lake Resident; Upper Snake Sage Grouse Local Working Group—Wendy Green Lowe, Facilitator; The North American Grouse Partnership—Kent Christopher; George Woodie—Resident of Howe and livestock permittee.

Presentations were made to: The Fort Hall Tribal Council, the Butte County Commissioners, the Clark County Commissioners, and the Jefferson County Commissioners.

### **5.2 Interdisciplinary Team Members**

Name	Agency/Organization	Resource Specialty
Dick Munoz	FWS	Wildlife/listed species
Steve Schmidt	IDF&G	Wildlife/game species
Bob Jones	DOE-ID	Interagency Coordinator
Gerry Deutscher	FWS	Wildlife
Michael Jackson	INEEL, BBWI	INEEL Infrastructure
Willie Preacher	Sho-Ban Tribe	Native American Concerns
Roger Blew	Stoller, Inc	Vegetation/Fire Ecology
Ken Thacker	BLM	Team lead

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## 7. GLOSSARY OF TERMS

Abiotic	Nonliving components of an ecosystem such as soil, rock, air and water.
Acre	A unit of land area measurement that is equal to 43,560 sq. ft., a square of approximately 209 feet on each side, a circle with a radius of approximately 118 ft., or .4047 hectares.
Eolian	Deposits of sands and soils moved by the wind.
Allotment	A public land area designated for the use of a prescribed number and kind of livestock under one plan of management.
Annual Plant	A plant that lives for one year; seed germination, plant vegetative growth, reproduction and death all occur within one year.
Alluvium	Sediments deposited by moving waters.
Aquifer	A body of permeable rock that is capable of storing significant quantities of water, that is underlain by an impermeable layer, and through which ground water moves.
Biennial Plant	A plant that lives for two years, producing vegetative growth the first year, flowering and fruiting the second year, and then dying.
Biodiversity	A term used to describe all aspects of biological diversity, especially species richness, ecosystem complexity and genetic variation. Used here to refer only to endemic, native species.
Biological Control	The human use one organism to control another.
Biological Crust	see Microbiotic crust
Browse	(n) That part of leaf and twig growth of shrubs, woody vines and trees available for animal consumption. (v) Act of consuming browse.
Bunchgrass	A perennial grass that grows in an upright, compact bunch of tillers, lacking stolons or rhizomes; there is usually an apparent interspace between adjacent plants, unlike stolon- or rhizome-producing grasses that may grow in root-infused mats or sods.
Burn, Burn Area	An area over which fire has recently passed
Canopy	(1) The visual projection of the aerial portion of vegetation vertically downward, usually expressed as a percent of ground covered. (2) A generic term referring to the aerial portion of vegetation.
Canopy Cover	The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of plant foliage that includes small openings within the canopy; cp. <i>crown</i> .
Climate	The average or prevailing weather conditions of a place over a period of years, especially the range in seasonal temperatures and precipitation.
Community	A general term applied to any grouping of populations of different organisms found living together in a particular environment.

Competition	The interaction between individual plants or animals for limiting resources they need to survive.
Connectivity (Wildlife)	The arrangement of habitats that allow organisms to move across the landscape; patches of similar habitats are either close together or linked by corridors of appropriate vegetation; the opposite of fragmentation.
Conservation	Sound management within given social and economic constraints that produces goods and services for humans without depleting natural ecosystem diversity, and acknowledging the naturally dynamic character of biological systems.
Corridor (wildlife)	Patches of appropriate vegetation that permit wildlife to move to desirable or preferred habitats.
Cover	Maybe interpreted as the plants and/or plant parts: (1) living or dead, on the surface of the ground; (2) living plants and litter of dead parts of plants; (3) the area of ground cover by plants or one or more species; cp. <i>basal area</i> .
Cryptogamic Crust, Cryptobiotic Crust	See: Microbiotic crust.
Cultivar	A named variety, strain, genotype or race within a plant species, distinguished by adaptation and morphological, physiological, cytological or chemical characteristics; the word is derived from "cultivated variety."
Culture	The transfer of behavioural traits between individuals in a non-genetic manner such as through verbal or visual communication.
Defensible Space	A area where combustible fuels are kept to a minimum in order to make the area easily defended against wild fire.
Density	The number of individuals per unit area.
Desertification	The process by which an area or region becomes more arid through loss of soil and vegetative cover; often accelerated by misuse of resources and drought.
Desired Plant Community	A plant community that produces the kind, proportion and amount of vegetation necessary to meet or exceed objectives established for a specific site. The plant community is consistent with the site's capability to produce the desired vegetation through management.
Discharge	A measure of the water flow at a particular point, such as at the output of a hydro-power plant.
Disturbance	Refers to events that alter the structure, composition or function of the resource base, causing plant communities to move away from the stable state. Natural disturbances include drought, floods, wind, natural fires and herbivory, and diseases. Unnatural disturbance is human caused and include livestock grazing, road construction and use, human caused fire and the introduction of exotic species.
Diversity	The species richness and relative abundance of species present in an area.
Dominant	Plant species or species groups that, by means of their number, cover or stature, influence or control the presence or absence of associated species.

Ecological Integrity	The level of retention of endemic species and processes within an ecological system.
Ecosystem	A discrete landscape unit that consists of abiotic and biotic components interacting to form a more or less stable system.
Ecosystem Management	The use of an ecological approach to achieve multiple-use management of public lands by blending the needs of people and environmental values so that Forest Service and BLM lands represent diverse, healthy, productive and sustainable ecosystems.
Ecotype	A locally adapted population within a species that has certain genetically determined characteristics; cp. <i>genotype</i> .
Effective Moisture	The portion of water in a soil that can be absorbed by plant roots.
Endemic	Native to or restricted to a particular site, area, region or country.
Eradication	Complete kill or removal of an organism from a particular area; generally used in discussing noxious and invasive weeds.
Evolution	Change with continuity in successive generations of organisms.
Exotic	An organism or species that is not native to the region in which it is found.
Extinction	Elimination of a taxon from the community.
Firebreak Fuelbreak	A natural or constructed barrier to the spread of fire; usually created by the removal of vegetation; cp. <i>fireline</i> , <i>fuelbreak</i> .
Flora	The plants that grow in a specific region or area; a list of the plants
Fluvial	Pertaining to or produced by the action of a stream or river.
Forage	All browse and herbage that is available and acceptable to herbivorous animals, including wildlife and livestock.
Forb	A broad-leaved plant with no woody above ground growth which dies back to the ground surface each year.
Fragmentation (habitat)	The break-up of a large land area, such as sagebrush-steppe, into smaller patches isolated by roads, urban areas or areas converted to a different plant community; the opposite of connectivity.
Fuel (fire)	That portion of the plant community available to burn in a fire.
Genotype	The genetic constitution of an organism, as opposed to its physical appearance (phenotype). This usually refers to a specific set of genes in an organism. Specific allelic composition of a set of genes within individuals of a species that may occur across the range of the species.
Geographical Information System (GIS)	A computer system capable of holding and using data describing places on the earth's surface; an information management system that provides for the entry, storage, manipulation, retrieval and display of spatially oriented data.
Germination	The beginning of growth of a seed, spore, pollen, or other structure, usually in response to favorable environmental conditions and following a period of dormancy.

Global Positioning System (GPS)	A handheld, electronic receiver system that uses satellite transmissions to determine precise latitude and longitude of any location on the earth's surface; GPS data (positions) can be downloaded to a GIS.
Grassland	Ground covered by vegetation dominated by grasses. Correlates with rainfall volumes intermediate between deserts and forests. In the mid-latitudes also know as steppe or prairie, whereas in the tropics called savannah.
Gravel, Cobble, Stone	As defined in Soil Taxonomy (USDA, 1982): Gravel (2mm – 3 inches), cobble (3-10 inches, stones (> 10 inches).
Grazed	The consumption of standing biomass (forage) by livestock or wildlife.
Grazing System	Specialized grazing management that defines systematically recurring periods of grazing, deferment and/or rest.
Ground Cover	The area of the ground covered with vegetation when the canopy edge is projected downward perpendicularly.
Ground Water	Subsurface water that is in the zone of saturation; the top level of the ground water is the water table; source of water for wells, seeps, and springs. Compare Effluent water table, Influent water table.
Gully	A feature of surface erosion that develops from concentrated run-off which bites deep into the ground surface by the upstream migration of a headcut or knick point.
Habitat	The living place of an organism or community, characterized by its physical or biotic properties.
Halophyte	A plant that can grow in saline or highly alkaline and sodic soils.
Headfire	Ignition of a fire on the windward (upward) side of a burn resulting in a relatively rapidly moving flame-front, upslope or with prevailing wind direction.
Herbaceous	Nonwoody vegetation such as grasses and forbs.
Herding	The formation of large herbivores into groups of animals having a social organization. Also, the purposeful act of moving herds of animals.
Hydrology	The study of bodies of water on land and how they change with time.
Igneous	The major rock type formed from crystallization of a magma.
Incident Commander	The person on a fire fighting team who is in charge of the team.
Indigenous	Native born, growing or produced naturally in a particular region or country.
Infiltration	The downward entry of water into the soil. also Percolation
Influent Ground Water Table	Ground water that is taken up by the soils that underlay a stream; water flows from the streambed into the ground. An influent stream loses water to the soil's zone of saturation. Influent water tables are commonly found in arid climates. Influent streams may be susceptible to scouring and deeply incised erosion leading to the formation of gullies. Some influent streams may actually lose so much water that they dry up completely.



Integrated Weed Management	The control of weeds by using the combination of management measures which is the most cost effective and least damaging to the natural ecosystem. Can include various combinations of herbicides, biological controls, mechanical control, cultural control, and education.
Introduced Species	A species not a part of the original flora or fauna; most commonly used in revegetation terminology for adapted species from parts of the world other than the western USA.
Invasive Species	A species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.
Keystone species	A species, the presence or abundance of which indicates the extent to which a habitat is being exploited.
Knick point	An abrupt change of gradient within a drainage where surface flowing water imparts high levels of erosive energy on the channel.
Lacustrine	Pertaining to lakes or areas where lakes once existed.
Land Use Planning	The process by which decisions are made on future land uses over extended time periods that are deemed to best serve the general welfare. Decision-making authorities on land uses are usually vested in state and local government units, but citizen participation in the planning process is essential for proper understanding and implementation.
Lek	A breeding area where males of certain species of birds gather together to display in order to attract females.
Lichen	A composite organism consisting of a fungus and an algae or cyanobacteria living in a symbiotic relationship.
Limiting Factor	Any environmental factor that causes organisms to exist at sub-optimal level and thereby prevents an organism from reaching its full biotic potential.
Litter	The uppermost layer of organic debris on the soil surface; essentially the freshly fallen or slightly decomposed vegetal material.
Loess	Unconsolidated, wind-deposited sediments composed largely of silt-sized particles and showing little or no stratification.
Loosing stream	A stream that has a permeable bed through which it loses water flow to the ground water system below.
Management Objective	The objectives for which lands are managed, which includes specified uses accompanied by a description of the desired vegetation or desired future condition and the expected products and/or values.
Management Plan	A program of action designed to achieve a particular set of objectives.
Microclimate	Atmospheric conditions prevailing within a small space, usually influenced by localized influences such as vegetation or surface irregularities.
Microbiotic Crust	A community of non-vascular plants consisting mostly of cyanobacteria, green algae, lichens, mosses, microfungi and other bacteria occupying the surface few centimeters of soils. Also known as biological, cryptogamic, cryptobiotic, or microphytic soil crusts.

Mineral Material	A class of material that is sold by the Federal government through direct sales, as opposed to leased minerals or minerals located by mining claims. Mineral materials are low value per unit volume such as sand, gravel, stone, clay, and soil.
<b><u>Minimum Impact Suppression Tactics (MIST)</u></b>	<b><u>Use of those fire suppression tactics that minimize the amount of soil surface disturbance, destruction of existing vegetation and the need for post fire reclamation.</u></b>
Monitoring	The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives.
Multiple-Use	Use of land for more than one purpose; i.e., grazing livestock, wildlife habitat, recreation, watershed, etc. Not necessarily the combination of uses that will yield the highest economic return or greatest output per unit.
Mycorrhiza	A symbiotic relationship between a fungus and the roots of a vascular plant. Essential for the survival of some species and favorable for others.
Native Species	A species present or presumed present in an area before the beginning of recorded history. Assumed to have not been imported by man.
Natural community	The community of flora and fauna that would exist at a given location without the influence of man.
Natural resources (ecological resources)	Naturally occurring elements generally viewed as having values to man; includes plants, animals, air, water, land, minerals, space, research opportunities, and open space.
Naturalized Species	An introduced species that has become adapted and thrives in a new climate, ecological site, or different environment.
Niche	The functional position of an organism in its environment.
Nitrogen fixation	The reduction of gaseous molecular nitrogen, usually from the air, and its incorporation into nitrogenous compounds available to plants.
No-Action Alternative	The most likely condition expected to exist in the future if current management direction were to continue unchanged.
Noxious Weed	An unwanted plant specified by Federal or State regulations as being especially undesirable, troublesome, and difficult to control; often has negative ecological and economic impacts on public lands.
Off Highway Vehicle (OHV)	This designation replaces the off-road vehicle (ORV) designation and is all inclusive of un-surfaced roads; aids in management of seasonal closures on all un-surfaced roads needing protection during wet seasons or for protection of other resources or values.
Organic matter	In particular, the organic material present in soils; more generally, the organic component of an ecosystem.
Opportunistic Species	A species adapted for utilizing variable, unpredictable, or transient environments; cheatgrass is a good example.
Paradigm	A large-scale and generalized model that provides a viewpoint from which the real world may be investigated. It differs from most other models, which are abstractions based on data derived from the real world.

Parent material	The material from which a soil has developed through soil building processes.
Percolation	The downward movement of water through the soil, especially through soil that is saturated or near-saturation.
Perennial Plant	A plant that has a life span of 3 or more years.
Perennial water	A stream, river, spring or lake that contains water for the entire year under most conditions.
Phenotype	The appearance of an individual that would likely be different in a different environment.
Physical factor	An abiotic factor that influences growth and development of biologic organisms.
Pioneer plant	A plant species that occurs early in plant succession. Generally species exhibiting rapid growth, prolific production of easily dispersed seeds, and the ability to germinate and establish on open sites.
Playa	The lowest part of an intermountain basin that is frequently flooded by runoff from adjacent drainages or uplands.
Predation	Interaction between species where one species gains energy by consuming another.
Preservation	Management to keep an entire ecosystem and in its components alive, intact and in their original condition.
Pristine	A state of ecological stability or condition existing in the absence of direct disturbance of humans.
Productivity	A measure of the ability of a site to produce plants, usually expressed in weight per unit area.
Rangeland	Land on which the native vegetation (climax or natural potential) is predominately grasses, grass-like plants, forbs, or shrubs; includes lands revegetated naturally or artificially when routine management of that vegetation is accomplished mainly by manipulation of grazing. Rangeland includes natural grasslands, savannas, shrublands, most deserts, tundra, alpine communities, coastal marshes and wet meadows.
Range Condition	A generic term relating to present status of a unit of range in terms of specific values or specified potentials.
Rangeland health	The degree to which the integrity of the soil, vegetation, water and air as well as ecological processes are balanced and sustained.
Relict	Organisms that have survived while other related ones have disappeared. Often refers to species that formerly had a much wider distribution and have survived locally through periods of unfavorable conditions.
Resource Advisor	A position on a fire suppression team that is responsible to advise the Incident Commander on issues surrounding natural resource values that may be threatened by fire or fire suppression activities.
Resource Issue	A subject of interest and discussion that generally involves differing views as to allocations.

Rehabilitation (fire)	The repair of an area burned by wildfire utilizing native and non-native plant species to obtain a stable plant community that will protect the burned area from erosion and invasion by weeds.
Restoration	Holistic actions affecting both the abiotic and biotic components of a system taken to achieve desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling a system to resume acting in a natural way.
Revegetation	Establishing or re-establishing desirable plants in areas where the plant community is not adequate to meet management objectives without intervention.
Right-of-Way	A designated parcel of land, either linear or area in extent, that has been identified through the land use planning process, as the preferred location for existing and future ROWs that are similar, identical or compatible.
Riparian	The portion of a stream or lake shore that contains green vegetation most of the time. Contains vegetation that could not exist in the area without access to freely available water.
Runoff	The total stream discharge of water, including both surface and sub-surface to a stream channel.
Seedbank	Seed stored in the soil that will germinate given adequate conditions. Seeds produced by plants that occupy the site over many years principally build up the seedbank.
Shrub	A plant that has persistent, woody stems, a relatively low growth habit and generally produces several basal shoots instead of a single bole; it differs from a tree by its lower stature; maximum height is generally 3–4 meters (10–15 ft.).
Sod Forming Grasses	Stoloniferous or rhizomatous grasses that form a sod or turf.
Soil Erosion	Movement of soil material by running water, wind, moving ice, or gravitational creep. Natural erosion occurs where natural amounts of erosional processes act upon soils with natural amounts of protection (usually vegetation or rock). Accelerated erosion occurs due to unnatural events, usually human activity, which increases the rates of soil movement.
Soil disturbance	Natural and man caused disruption of the soil surface and/or standing vegetation.
Special Status Species	Species identified as having viability concerns because of significant current or predicted downward trends in (1) population numbers or density or (2) habitat capability that would reduce a specie's existing distribution. Also species identified as culturally important.
Stronghold (wildlife)	Landscapes and watersheds with extensive habitat that: (1) historically supported a particular species, (2) population numbers are stable or increasing and the local population is likely to be at half or more of its historical size and density, and (3) the population or metapopulation contains some minimum number of individuals with a normal age-class structure.

Succession	The sequential change in vegetation and associated animals, either in response to an environmental change or induced by the intrinsic properties of the organisms themselves; colonization of a new physical environment (site) by a series of plant & animal, seral communities until a final, equilibrium state is reached, which maybe 'climax'; new species modify conditions that eventually permit the replacement of one community by another.
Understory	The plants that grow under the canopy of other plants; usually refers to grasses, forbs and low shrubs growing under trees or larger shrubs.
Watershed	The area of land from which a surface watercourse or a groundwater system derives its water.
Water Table (Influent)	Ground water that recharges by surface water that infiltrates and percolates into the soil below the stream, typical of arid and semi-arid regions.
Weed	Any plant growing where unwanted, a plant that has a negative impact within a given management system.
Wildland Fire, Wildfire	Any fire, regardless of ignition source, that is burning outside of prescription or any fire burning on public lands or threatening public resources, where no fire prescription standards have been prepared.

# **Appendix A**

## **Proclamation for the INEEL Sagebrush Steppe Ecosystem Reserve**

To the People of Idaho:

We are proud to designate approximately 73,263 acres within the Idaho National Engineering and Environmental Laboratory (INEEL) as an important sagebrush plant community to be managed for its unique biological attributes and the enjoyment and scientific benefits of future generations. This acreage will be known as the “INEEL Sagebrush Steppe Ecosystem Reserve.”

The Reserve is a valuable ecological resource unique to the intermountain west and contains lands that have had little human contact for over 50 years. The Sagebrush Steppe Ecosystem across its entire range was listed as a critically endangered ecosystem by the national Biological Service in 1995, having experienced greater than a 98% decline since European settlement.

The Reserve provides inspiring vistas, important habitat, and home to some 270 vertebrate species throughout different parts of the year. A few of the more notable wildlife species include prairie falcons, sage grouse, sage sparrows, sage thrasher, pronghorn antelope, coyotes, badgers, bobcats, marmot and weasels. Species of public and regulatory concern using this ecosystem include bald eagle, ferruginous hawk, Northern loggerhead shrike, burrowing owl, pygmy rabbit and Townsends’ big-eared bat. Over 400 plant species, of which over 85% are native, include sagebrush, rabbit brush, numerous native wheatgrasses, Indian ricegrass, squirreltail, and others which are all interrelated in this unique sagebrush region.

We support the designation of the INEEL Sagebrush Steppe Reserve as a unique area needing special management considerations. We are signing this proclamation to assure that the area receives special scientifically controlled consideration. Conservation management in this area is intended to maintain the current plant community and provide the opportunity for study of an undisturbed sagebrush steppe ecosystem. Knowledge gained from these opportunities may help others understand what can be done to rehabilitate other ecologically unique sagebrush steppe areas in the west.

Traditional rangeland uses, which currently exist on a portion of the area, will be allowed to continue under this management designation. These lands are improving in ecological condition under their current management program and will provide the opportunity to study the “how and why” for these improvements. We also recognize and support options for future uses of the INEEL and other portions of its buffer zone, including the potential development of space initiatives.

This Proclamation signed between the Department of Energy (Department), the Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service (Service), and the State of Idaho, Department of Fish and Game (IDFG), designates the Reserve as unique, and to be managed and protected for future generations. The DOE, BLM and Service have signed a Memorandum of Agreement that outlines the overarching details for the development of a Natural Resources Management Plan (NRMP) for the Reserve. The BLM will be the lead agency in preparing the plan with the Service providing technical guidance for the preparation of the NRMP. The BLM will assure that the Shoshone-Bannock Tribes will be involved in the development of the Plan. Additionally, all other interested stakeholders will also be invited to participate in the development of the plan. Work on this plan will commence no later than 90 days from signing of this document.

BLM will provide technical assistance and lead in the areas of land and multiple use management. The IDFG will work with the Service in addressing animal population needs. DOE-ID will provide data from existing data sets and knowledge of the area after 50 years of history on the site.

We will continue to collaboratively explore different options for the most effective way to federally protect this parcel, including the opportunity for the DOI to assign special designation under one of its authorized authorities. Our goal is to ensure that this land is protected and maintained as a natural area and as a resource for the People of Idaho.

This document was signed on July 17, 1999, by Secretary of Energy Bill Richardson, (for) the Regional Director, Region 1 U.S. Fish and Wildlife Service by Richard Munoz, (for) the State Director of Idaho, Bureau of Land Management by Elena Daly, (for) the Interim Director, Idaho Fish and Game by Don Wright.

# Appendix B

## Rankings for Special Status Species

### U.S. Fish and Wildlife Service/National Marine Fisheries Service

**Experimental, nonessential (XN)**—Ranking currently applied to two reintroduced species: the gray wolf (south of I-90) and the whooping crane.

**Watch (W)**—(1)—Species that are stable but with Idaho populations that are on the periphery of their range, (2) Idaho population is disjunct but appears stable, (3) unique habitat, or the species is an indicator of a specific habitat type, or (4) the status of the species is poorly understood.

**Species of Concern (SC)**—An informal term for a species whose conservation status may be of concern to the USFWS and that might be in need of concentrated conservation actions. Such species do not receive any legal protection under ESA. Designation as an SC does not necessarily mean that the species will eventually be proposed for listing.

**Candidate (C)**—Species proposed for listing as either threatened or endangered.

**Threatened (T)**—Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

**Endangered (E)**—Any species which is in danger of becoming extinct throughout all or a significant portion of its range.

### Natural Heritage Program /Conservation Data Center

**Global rank indicator (G)**—denotes rank based on range-wide status.

**Trinomial rank indicator (T)**—denotes range-wide status of infraspecific taxa.

**State rank indicator (S)**—denotes rank based on status within Idaho.

**1 = Critically imperiled** because of extreme rarity or because some factor of its biology makes it especially vulnerable to extinction (typically 5 or fewer occurrences).

**2 = Imperiled** because of rarity or because other factors demonstrably make it very vulnerable to extinction (typically 6 to 20 occurrences).

**3 = Rare or uncommon** but not imperiled (typically 21 to 100 occurrences).

**4 = Not rare** and apparently secure, but with cause for long-term concern (usually more than 100 occurrences).

Example of Use:

G4T2 = species is apparently secure range-wide, but this particular subspecies or variety is imperiled.



## **Idaho Native Plant Society Rankings**

**State Priority (1)**—Taxa in danger of becoming extinct or extirpated from Idaho in the foreseeable future if identifiable factors contributing to their decline continue to operate; these are taxa whose populations are present only at critically low levels or whose habitats have been degraded or depleted to a significant degree.

**State Priority (2)**—Taxa likely to be classified as Priority 1 within the foreseeable future in Idaho, if factors contributing to their population decline or habitat degradation or loss continue.

**Sensitive (S)**—Taxa with small populations or localized distributions within Idaho that presently do not meet the criteria for classification as Priority 1 or 2 but whose populations and habitats might be jeopardized without active management or removal of threats.

**Monitor (M)**—Taxa that are common within a limited range as well as those taxa which are uncommon but have no identifiable threats.

**Review (R)**—Global and State rare taxa which may be of conservation concern in Idaho but for which insufficient data exists upon which to base a recommendation regarding appropriate classification.

## **BLM Rankings**

**Sensitive Species (S)**—Taxa (1) that are under status review by U.S. Fish and Wildlife Service/National Marine Fisheries Service, (2) whose numbers are declining so rapidly that Federal listing might become necessary, (3) with typically small and widely dispersed populations, or (4) inhabiting ecological refugia or other specialized unique habitats.

**Watch List (W)**—Species whose populations and range appear to be restricted, but information is lacking as to the cause or the species is indeed heading towards extinction and in need of management action to reduce or remove threats.

## **Appendix C**

### **Guidelines to Manage Sage Grouse Populations and their Habitats**

The following is the portion of the guidelines applicable to migratory sage grouse populations.

#### **Definitions**

For the purpose of these guidelines, we define an occupied lek as a traditional display area in or adjacent to sagebrush-dominated habitats that has been attended by  $\geq 2$  male sage grouse in  $\geq 2$  of the previous 5 years. We define a breeding population as a group of birds associated with one or more occupied leks in the same geographic area separated from other leks by  $> 20$  km. This definition is somewhat arbitrary but generally based on maximum distances females move to nest.

#### **Breeding habitat management**

For both migratory and non-migratory populations, lek attendance, nesting, and early brood rearing occur in breeding habitats. These habitats are sagebrush-dominated rangelands with a healthy herbaceous understory and are critical for survival of sage grouse populations. Mechanical disturbance, prescribed fire, and herbicides can be used to restore sage grouse habitats to those conditions identified as appropriate in the following sections on habitat protection. Local biologists and range ecologists should select the appropriate technique on a case-by-case basis. Generally, fire should not be used in breeding habitats dominated by Wyoming big sagebrush if these areas support sage grouse. Fire can be difficult to control and tends to burn the best remaining nesting and early brood rearing habitats (i.e., those areas with the best remaining understory), while leaving areas with poor understory. Further, we recommend against using fire in habitats dominated by xeric mountain big sagebrush (*Artemisia tridentata xericensis*) because annual grasses commonly invade these habitats and much of the original habitat has been altered by fire (Bunting et al., 1987).

Although mining and energy development are common activities throughout the range of sage grouse, quantitative data on the long-term effects of these activities on sage grouse are limited. However, some negative impacts have been documented (Braun, 1998; Lyon, 2000). Thus, these activities should be discouraged in breeding habitats, but, when unavoidable, restoration efforts should follow procedures outlined in these guidelines.

#### ***Habitat protection***

1. Manage breeding habitats to support 15–25% canopy cover of sagebrush, perennial herbaceous cover averaging  $\geq 18$  cm in height with  $\geq 15\%$  canopy cover for grasses and  $\geq 10\%$  for forbs and a diversity of forbs (Barnett and Crawford, 1994; Drut et al., 1994a; Apa, 1998) during spring. Habitats meeting these conditions should have a high priority for wildfire suppression and should not be considered for sagebrush control programs. Sagebrush and herbaceous cover should provide overhead and lateral concealment from predators. If average sagebrush height is  $> 75$  cm, herbaceous cover may need to be substantially greater than 18 cm to provide this protection. There is much variability among sagebrush-dominated habitats (Tisdale and Hironaka, 1981; Hironaka et al., 1983) and some Wyoming sagebrush and low sagebrush breeding habitats may not support 25% herbaceous cover. In these areas, total herbaceous cover should be  $\geq 15\%$ . Further, the herbaceous height requirement may not be possible in habitats dominated by grasses that are relatively short when mature. In all of these cases, local biologists and range ecologists should

develop height and cover requirements that are reasonable and ecologically defensible. Leks tend to be relatively open, thus cover on leks should not meet these requirements.

2. For migratory populations, identify and protect breeding habitats within 18 km of leks in a manner similar to that described for non-migratory sage grouse. For migratory sage grouse, leks generally are associated with nesting habitats but migratory birds may move >18 km from leks to nest sites. Thus, protection of habitat within 3.2 km of leks may not protect most of the important nesting areas (Wakkinen et al., 1992; Lyon, 2000).
3. In areas of large-scale habitat loss ( $\geq 40\%$  of original breeding habitat), protect all remaining habitats from additional loss or degradation. If remaining habitats are degraded, follow guidelines for habitat restoration listed below.
4. During drought periods ( $\geq 2$  consecutive years), reduce stocking rates or change management practices for livestock, wild horses and wild ungulates if cover requirements during the nesting and brood rearing periods are not met. Grazing pressure from domestic livestock and wild ungulates should be managed in a manner that, at all times, addresses the possibility of drought.
5. Suppress wildfires in all breeding habitats. In the event of multiple fires, land management agencies should have all breeding habitats identified and prioritized for suppression, giving the greatest priority to breeding habitats that have become fragmented or reduced by  $>40\%$  in the last 30 years.
6. Adjust timing of energy exploration, development, and construction activity to minimize disturbance of sage grouse breeding activities. Energy-related facilities should be located  $\geq 3.2$  km from active leks whenever possible. Human activities within view of or  $<0.5$  km from leks should be minimized during the early morning and late evening when birds are near or on leks.

### ***Habitat restoration***

1. Before initiating vegetation treatments, quantitatively evaluate the area proposed for treatment to ensure that it does not have sagebrush and herbaceous cover suitable for breeding habitat. Treatments should not be undertaken within sage grouse habitats until the limiting vegetation factor(s) has been identified, the proposed treatment is known to provide the desired vegetation response, and land use activities can be managed after treatment to ensure that vegetation objectives are met.
2. Restore degraded rangelands to a condition that again provides suitable breeding habitat for sage grouse by including sagebrush, native forbs (especially legumes), and native grasses in reseeding efforts (Apa, 1998). If native forbs and grasses are unavailable, use species that are functional equivalents and provide habitat characteristics similar to those of native species.
3. Where the sagebrush overstory is intact but the understory has been degraded severely and quality of nesting habitat has declined, use appropriate techniques (e.g., brush beating in strips or patches and interseed with native grasses and forbs) that retain some sagebrush but open shrub canopy to encourage forb and grass growth.
4. Do not use fire in sage grouse habitats prone to invasion by cheatgrass and other invasive weed species unless adequate measures are included in restoration plans to replace the cheatgrass understory with perennial species using approved reseeding strategies. These strategies could

include, but are not limited to, use of pre-emergent herbicides (e.g., Oust®, Plateau®) to retard cheatgrass germination until perennial herbaceous species become established.

5. When restoring habitats dominated by Wyoming big sagebrush, regardless of the techniques used (e.g., prescribed fire, herbicides), do not treat >20% of the breeding habitat (including areas burned by wildfire) within a 30-year period (Bunting et al., 1987). The 30-year period represents the approximate recovery time for a stand of Wyoming big sagebrush. Additional treatments should be deferred until the previously treated area again provides suitable breeding habitat. In some cases, this may take <30 years and in other cases >30 years. If 2,4-D or similar herbicides are used, they should be applied in strips such that their effect on forbs is minimized. Because fire generally burns the best remaining sage grouse habitats (i.e., those with the best understory) and leaves areas with sparse understory, use fire for habitat restoration only when it can be convincingly demonstrated to be in the best interest of sage grouse.
6. When restoring habitats dominated by mountain big sagebrush, regardless of the techniques used (e.g., fire, herbicides), treat ≤20% of the breeding habitat (including areas burned by wildfire) within a 20-year period (Bunting et al., 1987). The 20-year period represents the approximate recovery time for a stand of mountain big sagebrush. Additional treatments should be deferred until the previously treated area again provides suitable breeding habitat. In some cases, this may take <20 years and in other cases >20 years. If 2,4-D or similar herbicides are used, they should be applied in strips such that their effect on forbs is minimized.
7. All wildfires and prescribed burns should be evaluated as soon as possible to determine if reseeding is necessary to achieve habitat management objectives. If needed, reseed with sagebrush, native bunchgrasses, and forbs whenever possible.
8. Until research unequivocally demonstrates that using tebuthiuron and similar acting herbicides to control sagebrush have no long-lasting negative impacts on sage grouse habitat, use these herbicides only on an experimental basis and over a sufficiently small area that any long-term negative impacts are negligible. Because these herbicides have the potential of reducing but not eliminating sagebrush cover within grouse breeding habitats, thus stimulating herbaceous development, their use as sage grouse habitat management tools should be examined closely.

The pertinent sections of the sage grouse guidelines regarding management of winter habitat for sage grouse follow:

#### ***Winter habitat management***

Sagebrush is the essential component of winter habitat. Sage grouse select winter use sites based on snow depth and topography and snowfall can affect the amount and height of sagebrush available to grouse (Connelly, 1982; Hupp and Braun, 1989; Robertson, 1991). Thus, on a landscape scale, sage grouse winter habitats should allow grouse access to sagebrush under all snow conditions.

#### ***Habitat protection***

1. Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with canopy cover of 10–30% and heights of at least 25–35 cm regardless of snow cover. These areas should be high priority for wildfire suppression and sagebrush control should be avoided.

2. Protect patches of sagebrush within burned areas from disturbance and manipulation. These areas may provide the only winter habitat for sage grouse and their loss could result in the extirpation of the grouse population. They also are important seed sources for sagebrush re-establishment in the burned areas. During fire suppression activities do not remove or burn any remaining patches of sagebrush within the fire perimeter.
3. In areas of large-scale habitat loss ( $\geq 40\%$  of original winter habitat), protect all remaining sagebrush habitats.

#### ***Habitat restoration***

1. Reseed former winter range with the appropriate subspecies of sagebrush and herbaceous species unless the species are re-colonizing the area in a density that would allow recovery within 15 years.
2. Discourage prescribed burns  $> 50$  ha and do not burn  $> 20\%$  of an area used by sage grouse during winter within any 20–30 year interval (depending on estimated recovery time for the sagebrush habitat).

#### **General Habitat Management from the Sage Grouse Guidelines:**

##### ***General habitat management***

The following guidelines pertain to all seasonal habitats used by sage grouse.

1. Monitor habitat conditions and only propose treatments if warranted by range condition (i.e., the area no longer supports habitat conditions described in the following guidelines under habitat protection). Do not base land treatments on schedules, targets, or quotas.
2. Use appropriate vegetation treatment techniques (e.g., mechanical methods, fire) to remove junipers and other conifers that have invaded sage grouse habitat (Commons et al., 1999). Whenever possible, use vegetation control techniques that are least disruptive to the stand of sagebrush, if this stand meets the needs of sage grouse.
3. Increase the visibility of fences and other structures occurring within one km of seasonal ranges by flagging or similar means if these structures appear hazardous to flying grouse (e.g., birds have been observed hitting or narrowly missing these structures or grouse remains have been found next to these structures).
4. Avoid building powerlines and other tall structures providing perch sites for raptors within 3 km of seasonal habitats. If these structures must be built, or presently exist, the lines should be buried or poles modified to prevent their use as raptor perch sites.

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## **Appendix D**

### **Response to Public Comments**

BLM policy requires that public comments received on NEPA documents be addressed if they are substantive and relate to inadequacies or inaccuracies in the analysis or methodologies used; identify new impacts or recommend reasonable new alternatives or mitigation measures. Comments expressing personal preferences or opinions are generally not considered substantive.

The public comment period for the Reserve began August 1, 2003 and ended September 5, 2003. During this time comments were received from: George Woodie, livestock grazing permittee; the Idaho Department of Parks and Recreation; Gerald Messerli, representing the Mud Lake Water Users, Inc. and the Continental Divide Watershed Advisory Group; Katie Fite and John Marvel representing the Committee for the High Desert and the Western Watersheds Project; and Trish Klar representing The Nature Conservancy.

#### **Substantive comments from George Woodie:**

**Comment:** The [200 yard] set-back of the proposed boundary fence from Highway 22 would remove more than a full section of land from [the Wigwam Butte Allotment]. The fence would also [create a barrier to livestock] at Cedar Point [along Highway 33].

**Response:** The reason for the set-back is to minimize the risk of pronghorn antelope being trapped on Highway 22. We agree that a 200 yard set-back may be excessive. The proposed action will be changed to allow for the Sagebrush Steppe Ecosystem Management Committee to select the final design for the fence with rancher and wildlife biologist involvement.

**Comment:** It seems logical that the [Sagebrush Reserve] be moved further south to avoid the cattle allotments and highways.

**Response:** The size and shape of the Reserve were determined during the proclamation process and changing these is beyond the scope of this plan. The boundaries were chosen to include examples of areas affected by livestock grazing, livestock exclusion, and transportation and utility corridors within an intact sagebrush system for scientific study. Changing the boundaries to exclude these features would exclude the opportunity for study and not accomplish the objectives of the reserve. Minor adjustments may be made to accommodate small needs such as fence corners, existing road modifications, etc.

**Comment:** It is stated in the EA that the entire flow [of Birch Creek] was diverted for irrigation by the Reno Ditch in the early 1900s. This is not true because three ranches above the diversion had older water rights [and removed some of the flows above the diversion].

**Response:** Thank you for the information. The document should have stated that the entire flow of Birch Creek at the Reno ditch was diverted into the ditch. Section 3.9 has been changed to reflect this.

#### **Substantive Comments received from the Mud Lake Water Users, Inc. and the Continental Divide Watershed Advisory Group**

**Comment:** I am concerned about the “voluntary” buy backs [of the grazing leases] contained in Alternative 3. If the ranchers do not have access to this grazing, many would be forced out of business. Your analysis states that these smaller ranches would be bought out by larger ranches and that there

would be no net change to the local economy. If they are bought out by larger ranches, it is my experience that the larger operations are located elsewhere and do not contribute to the local economy.

**Response:** The EA repeatedly states that grazing leases would be purchased only as voluntary relinquishments. If after selling the permit the operation went out of business, then the sellers either decided to go out of business or made a bad business decision. In either case the operator would not be “forced” out of business. The Analysis of Effects section (page 54) states that in the worse case, 5 operators could go out of business (if they sold their Reserve leases) and that their properties would then be sold to “other operators” resulting in an annual loss of approximately \$83,317 and 1.14 full time jobs from the local economy. These losses would be due to ending the grazing on the Reserve, not operators going out of business. It is possible that large absentee ranches would purchase these properties, but it is also possible that other local operators would add to their holdings.

**Comment:** Your interdisciplinary team contains no one representing local ranching interests. Of the alternatives presented, Alternative 4 appears to be the only one in which the environmental groups offer any compromise.

**Response:** The interdisciplinary team does not include any special interest groups. Public comment has been received from people representing a variety of interests and this information was used to develop issues and alternatives as required by the National Environmental Policy Act. All interest groups had equal opportunity for involvement in the scoping process which led to development of the alternatives. The groups have also had equal opportunity for review and comment on the EA. Recently received comments, such as yours, were considered during development of the EA. Future management of the Reserve will be guided by the Long-Term Management Committee and we encourage you to remain involved with them.

**Comment:** I feel that ranching interests [should be included] on the [Long-Term Management Committee] advisory board.

**Response:** Including private partners on the Long-Term Management Committee would bring the group under the definition of an “advisory committee” under the Federal Advisory Committee Act (FACA). As such, the group would be required to submit a public report to the President each year, who is then required to report to Congress. These reports contain information such as the committee’s functions, reports it has submitted, a statement of whether it is an ad hoc or continuing body, the dates of its meeting, the names and occupations of its current members, and the total estimated annual cost to the United States to fund, service, supply, and maintain such committee. FACA also specifies that the number of advisory committees be kept to a minimum. The ID team decided that these added layers of complexity would be detrimental to the function of the Committee and that open meetings would be conducted where possible to seek input from the public.

#### **Substantive comments received from the Committee for the High Desert and the Western Watersheds Project:**

**Comment:** BLM has failed to supply ANY information in the EA on the ecological condition, failed to conduct a current Standards and Guides assessment, failed to present data on utilization and use pattern mapping, and failed to provide any information that allowed scientific analysis of the impacts of current livestock grazing on the Reserve and surroundings.

**Response:** Extensive inventory of range condition and livestock use on these allotments has not been conducted. The location of the Reserve was selected to include plant communities that are in excellent condition as recognized by the Secretary of Energy in the Proclamation (Appendix 1). In addition,



anecdotal information collected from many field tours and professional judgment of numerous agency staff and members of the academic community has recognized the quality of the plant communities on the Reserve. In the Affected Environment (page 17) the EA provides descriptions of the plant communities on the Reserve that include statements such as “pre-European Settlement condition” and “relic condition”. Upon review of the EA, descriptions of the Reserve understate the overall plant community condition and modifications have been made to more accurately describe current conditions. The BLM Rangeland Health Assessment was not considered because the condition of the Reserve plant community will be held to a higher standard.

**Comment:** BLM has failed to conduct any rational analysis of continuing livestock grazing-basically status quo at extremely high stocking rates and utilization levels-on protection of plant communities and wildlife habits, protection of special status plant and wildlife species, wildlife management, and invasive plants.

**Response:** Current grazing practices have allowed the plant community to develop to a pre-European settlement condition over most of the Reserve. The EA states that there are exceptions around livestock concentration areas and roads, but that these do not cover a significant acreage. Most of the management actions recommended in this plan are intended to minimize or eliminate these problem areas. The ID team believes that major changes to livestock management are not necessary. Evidence of livestock grazing is difficult to find on most of the Reserve, with 50% utilization levels seldom reached.

**Comment:** BLM has failed to address the issue of predator control in this EA.

**Response:** Predator control was not considered and does not fit with the management goals of the Reserve. This action has been addressed in the addendum to the document.

**Comment:** The EA admits that 89% of the Reserve is sage grouse nesting habitat and that portions do not meet the requirements for suitable nesting. Yet, nowhere does the EA propose any positive action to address the livestock degradation that is causing these habitats to be unsuitable.

**Response:** The area covered by several of the major native plant communities described in the Affected Environment does not have the potential to support the big sagebrush community necessary for sage grouse nesting. This represents the majority of the unsuitable nesting habitat on the Reserve. However, areas along highways and power lines that have been seeded to crested wheatgrass, and livestock concentration areas also do not meet the requirements. The Proposed Action contains recommendations that crested wheatgrass seedings and livestock concentration areas be evaluated and treated or restored as necessary. Widespread plant community degradation due to livestock grazing does not occur on the Reserve.

**Comment:** As part of management of wildlife populations, BLM must look beyond the Reserve Boundaries.

**Response:** We agree. However, this plan addresses only the Reserve. The BLM Resource Management Plan for the Idaho Falls Field Office will address wildlife issues on the surrounding public land.

**Comment:** Grasshopper spraying by APHIS should be prohibited on Reserve lands.

**Response:** Spraying with insecticides on the Reserve does not fit with the management goals and this issue has also been addressed in the addendum.

**Comment:** BLM must adopt an alternative that contains the following provisions: a quarantine of livestock [before] moving onto the Reserve, certifying that livestock be weed free, 10 years of post fire rest, require that utilization not exceed 25% on native bunchgrasses, and develop standards that limit trampling damage to biological crusts.

**Response:** Practicality of operation and existing research do not support the need for these changes. However, the Reserve has been set aside to provide a location for research into rangeland management that may justify changes to livestock grazing, both on the Reserve and within the region in the future.

**Comment:** The BLM must provide specific periods of non-use for disturbed [livestock concentration] areas.

**Response:** This is potentially included in the Proposed Action (page 7) for restoration of livestock concentration areas.

**Comment:** BLM must end livestock grazing during critical nesting periods and stop authorizing livestock grazing and trailing during critical growing periods for native grasses and forbs.

**Response:** We believe that the high quality plant communities on the Reserve provide sufficient protection for nesting birds and no justification exists for broad changes to grazing management.

**Comment:** BLM fails to examine removal of [livestock] watering sites and must provide a map showing locations.

**Response:** The stock tank locations were inadvertently left off of the Grazing Allotment map. The three permanent locations on the Reserve are all within the Wigwam Butte Allotment. All other permanent locations are on adjacent BLM lands. Sheep herders use portable tanks that are frequently moved. The Proposed Action states that "each livestock concentration area would be evaluated on a case-by-case basis to determine needs for restoration". In some cases this could mean permanent relocation of the tanks.

**Comment:** A primary goal of management must be removal of the crested wheatgrass seedings and restoration with native vegetation.

**Response:** The Proposed Action specifies that crested wheatgrass stands be evaluated and treated as necessary. This could include replacement with native plants.

**Comment:** [You provide insufficient information about returning water to Birch Creek.]

**Response:** No concrete plans exist for returning winter flows to the creek. Whenever and wherever this happens, a separate environmental analysis would be completed as required by NEPA.

**Comment:** You have failed to analyze the impacts of [the proposed boundary fence].

**Response:** The EA (page 42) lists the negative impacts of the fence. We recognize that some level of damage to big game will occur, regardless of fence design, but believe that livestock control is most important. Perching habitat created by the fence would generally be no higher than existing sagebrush and/or be located along the highway and power line rights-of-way. The ROW areas are already in a disturbed condition and provide minimal habitat for prey that could be reached from a fence.

**Comment:** Please provide more information [about the livestock trespass] and information about prosecuting those responsible.

**Response:** With no boundary fence, cattle from the Wigwam Butte Allotment can freely move across Highway 22 into the non-grazed area. This problem has only recently been recognized. Until the fence is built, constant herding would be necessary to totally prevent the cattle from crossing the highway, especially during the winter. The ID team felt that herding would increase surface damage due to increased livestock movement and the addition riders. The permittee will likely be required to increase his level of vigilance and herding to some degree.

**Comment:** Radioactive Contamination levels should be measured as part of management of the Reserve.

**Response:** The INEEL spends large sums of money and a lot of time measuring these contaminants, as well as many others known to be on the site. This activity is beyond the scope of this management plan.

**Substantive comments received from the Nature Conservancy:**

**Comment:** The Mission Statement states the Reserve "...shall be managed as a laboratory..." We think that using the word *shall*, might constrict future management options and that the word *laboratory* suggests human perturbations followed by observation. We recommend calling the Reserve a natural area, a natural research area or even a research natural area, as opposed to a laboratory.

**Response:** The ID team believes that the portion of the mission statement which states "...where all native ecosystem components, cultural resources and Native American Tribal values are conserved..." provides appropriate guidance for the Long-Term Management Committee. Identifying the Reserve as a natural area and preserving it without ANY human perturbation would severely limit research opportunities and not conform with the intent of the Proclamation (Appendix A).

**Comment:** [We recommend re-writing Management Goal 1 to state more explicitly that the priority management goal is to secure the existing high quality habitats and ensure management to protect them.]

**Response:** We agree. The Management Goals and Objectives on page 2 have been adjusted.

**Comment:** [We recommend that the plan] clearly designate the lead agency responsible for the storage, management, and dissemination of data and information.

**Response:** These functions are currently carried out by the Environmental Surveillance, Education and Research program managed by Stoller, Inc. under contract to DOE-ID. The Reserve Long-Term Management Committee could make recommendations for changes in the future, but the need for this cannot be predicted.

**Comment:** We recommend that Reserve Management Committee consider expanding the Committee membership to include private partners to increase [the potential for] attracting grants and funding dollars.

**Response:** As stated previously, including private partners on the Long-Term Management Committee would bring the group under the definition of an "advisory committee" under the FACA. The ID team decided that these added layers of complexity would be detrimental to the function of the Committee and that open meetings would be conducted where possible to seek input from the public.

**Comment:** We recommend that ALL vehicles, not just those listed in the Proposed Action be required to go through the washing station.

**Response:** We believe this to be impractical. Large numbers of over-the-road vehicles enter the INEEL each day and remain within the DOE-ID facilities and/or on the paved roads. Off-road vehicles have the

highest risk of both carrying seeds and depositing them where they can become a problem. We believe that by targeting these high risk vehicles, we can greatly reduce importation of seeds. Washing all vehicles would significantly increase costs without having a large net improvement on the numbers of weed seeds imported to the Reserve.

**Comment:** We recommend that the Proposed Action include the option for purchase and retirement of grazing permits from willing sellers.

**Response:** We agree. The Environmental Consequences section estimates that there are economic costs, but it is the voluntary nature of this action that the team believes justifies its inclusion. This has been included in the selected alternative in the FONSI.